

COMPUTERWORLD

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The Xerox 560 offers up to 128 lines for time-sharing and transaction processing in addition to general-purpose batch and remote batch processing. Disk systems with 100M bytes of storage and 125 in./sec, 1,600 bit/in. tape units are attached.

Nixon's Privacy Message May Receive Extra Care

By E. Drake Lundell Jr.

CW Washington Bureau

WASHINGTON, D.C. — President Nixon last week ordered yet another review of the privacy question in his State of the Union message.

But this "extensive cabinet-level" review of the subject may receive more attention at the highest levels of government than either the National Academy of Sciences report or the Department of Health Education and Welfare report as the president tries to overcome the image of one who cares not enough about the privacy of individuals.

Also, the mention of the entire subject of privacy in the technological age in a State of the Union message is considered significant in itself by many civil libertarians here, although most of them feel the President did not go far enough.

In the 22,000-word message sent to Congress as he was delivering his oral message, Mr. Nixon said that "one of the rights we cherish most in America is the right of privacy."

"With the advance of technology, that right has been increasingly threatened."

The problem is not simply one of setting effective curbs on invasions of privacy, but, even more fundamentally, one of limiting the uses to which essentially private information is put, and of recognizing the basic proprietary rights each individual has in information concerning himself," he added.

However, Mr. Nixon said that "privacy, of course, is not absolute," and indicated that in some areas it might conflict with national goals or needs, "but where conflicts occur, an intelligent balance must be struck."

"One part of the current problem," Mr. Nixon said, "is that as technology has increased the ability of government and private organizations to gather and disseminate information about individuals, the safeguards needed to protect the privacy of individuals and communications have not kept pace."

(Continued on Page 2)

Packet Nets Drop Discount Plan

By Alan Taylor

Special to Computerworld

WASHINGTON, D.C. — Two major packet-switching networks have abandoned plans to provide quantity discounts ranging up to 88% [CW, Jan. 30].

First to drop out was Packet Communications, Inc., whose president, Lee Talbert, said he had not looked at the tariffs from the point of view of the possible unfairness to small computer users which could not qualify for the full discounts. The details of the new tariff have not been announced officially.

Shortly afterward, Telenet vice-president Stuart Mathison said Telenet was also dropping quantity discounts. He explained that the company had intended to restrict the discount to the individual

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Contracts? Write Your Own Fill in the Blanks

By Marcia L. Geyer

Special to Computerworld

Suppose you get outside help for your new order entry system; three months later, your company is sued by the lessor of the report generator package you use, which one of the consultants pirated without his firm's or your knowledge.

Did you include the two clauses in the contract which can protect you? Could you get hung up in an argument where you claim your consultant should have been billed at his straight daily rate, while his firm claims it is entitled to bill for a shift differential because it always bills for a shift differential — with nothing definite in the contract?

Writing your own T & M (time and materials) contract can save you a lot of time, confusion, aggravation and potential loss. If you frequently use consulting services as an adjunct to your staff, it even makes sense to write a fill-in-the-blanks model contract.

Xerox 550, 560 Structured Around Multiprocessors

By Vic Farmer

Of the CW Staff

EL SEGUNDO, Calif. — Xerox has taken a step in the direction of distributed processing (a la Control Data Cyber 70s) by switching to multiple processor architecture in its 550 and 560 mainframes announced last week.

While the 550 in conjunction with a new virtual-oriented operating system — Control Program for Real Time (CP-R) — is designed for real-time scientific environments, the 560 is a virtual memory-oriented, general-purpose mainframe using the CP-V operating system used in the Sigma Series.

The 560 architecture is organized as a series of memory units and processor clusters. Each memory unit contains up to 32K words of storage and provides up to six separate and independent access paths. The processor clusters — up to 22 — are either arithmetic/logic units or multiplexing I/O processors.

Centralized systems operations are directed by a system control processor with functions such as interrupts, system clock, system control panel, configuration control panel, real-time clocks, operator's console, remote assist facilities and power fail-safe unit. The 550 architecture is similar.

'Optimum Rates'

Through selective configuration of the processing units the systems can be adapted to the user's applications "to produce optimum data rates and throughput," according to Xerox.

Both mainframes have integrated circuit control memory, memory expansion to 1M bytes, upward compatibility from the Sigma computers, four register blocks, four real-time clocks, 14 internal and up to 48 external priority interrupts, and memory access protection.

There are six classes of error detection for all processors and 13 error detection tests for memory banks.

Both systems provide for connection of a communications line through which hardware and software maintenance specialists at regional offices can control and test the systems. In effect, the regional office can duplicate the functions of the local operator's console, and can run diagnostic programs, interrogate the system log and help in debugging programs, according to the company.

On the 560, five processing modes can be used concurrently: multiprogrammed batch, remote batch, conversational time-sharing, real-time and transaction processing. Up to 128 lines can be used for time-sharing and transactional processing while local and remote-batch operations are in progress.

The 560 hardware has direct, indirect and indexed addressing, double-precision floating point, decimal arithmetic, 64 general registers in four 16-register blocks with seven index registers for each of the 16 blocks.

Memory cycle time is 645 nsec and the memory employs two-way interleaving. The data rate on the I/O processors is up

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New Features Mark Caravan, D.C. First Stop

NEWTON, Mass. — "New data management software developed by the vendors over the past couple of years is significantly changing the entire user interaction and use of the hardware," said Andrew O. Atkinson, director of the Hamilton County (Ohio) Regional Computer Center.

Because of this ever-changing situation, Atkinson feels a transfer of information among users is essential.

"We expect to gain a great deal as well as contribute quite a bit," he said, referring to his upcoming participation as a panelist with the Computer Caravan, which is set to open in Washington, D.C., Feb. 20.

Atkinson, who will be addressing the Cincinnati Caravan on data communications equipment selection, feels that as a speaker he will have the opportunity to not only impart his experience, but also

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Paper Carries Carpool Idea—Literally

PHOENIX — A free computerized carpool with a different approach has been set up as a service for more than 50,000 employees in over 6,000 businesses covering a 25-square-mile radius in Phoenix's Central Ave. Corridor.

With all aspects of the project donated by area businessmen, the Central Corridor Carpool is giving the general public the means and opportunity to form its own commuter pool, according to LeRoy Ellison, chairman of the carpool committee.

To set up the project, more than 40,000 data input cards were placed inside the Jan. 16 issue of the *Phoenix Central News*, a free weekly publication which is distributed throughout the area. Included in the papers were maps of the county with residential and business districts divided into 329 numbered sections, Ellison said. To join the carpool, one filled out the card with first initial, last name, the appropriate home and work section numbers from the map and business phone,

and mailed it to the newspaper office.

Processing time on an IBM 360/30 and keypunching have been donated by James L. Jenkins, president of Professional Data Processing Services, Inc.

"We got 500 responses within a three-day period," according to Jenkins. "The way it looks right now, this week we'll have about 2,000 to 3,000 names published in it so we're very encouraged."

"There will be a special ID number for each name," Ellison said. "When that person, and others who live and work in his area, have formed a carpool, they can then notify the newspaper and their names will be taken off the master list."

The Central Corridor program is designed to test public acceptance of carpooling before expanding valley-wide, Ellison said.

Xerox CPUs Use Multiprocessing

(Continued from Page 1)

to 1 Mbyte/sec per processor. Up to 16 I/O processors have 16 channels apiece. Up to five "rotating memory processors" can control up to 15 devices each.

New Peripherals

Among the new peripherals offered with the 560 system are a 100M-byte disk

pack-type drive and a 2.88M byte fixed-head disk.

Language processors include extended Fortran IV, Basic, APL, Ans Cobol and RPG.

A typical configuration of the 550 system with 256K bytes of memory, card reader, fixed-head disk, line printer and magnetic tape will sell for \$280,780 or rent for \$7,524/mo on a four-year lease.

A 560 with 384K memory, 24 lines, three disk drives, printer, punch card reader, four tape units and fixed-head disk will sell for \$723,650 or rent for \$17,028/mo on a four-year lease.

Deliveries are scheduled to begin in the fourth quarter of this year.

New Features Mark Caravan '74

(Continued from Page 1)

to benefit from discussions which arise during the panels and workshops.

This year's Caravan format resembles that of 1973. Local users in each of 10 cities around the country will be on hand

to discuss their actual conversion or implementation experiences.

Some changes, however, are scheduled for the Computerworld-sponsored show. The workshops, rather than being continued after lunch, will be repeated this year, thereby permitting attendees to participate in two workshops rather than being limited to one.

The first day of the Caravan is again dedicated to data entry. This year, however, a new topic, point-of-sale, has been added to reflect the state of the industry. The other topics will be off-line key entry, optical scanning and intelligent terminals.

Day two features a "Data Communications Update" where panelists will discuss the relative merits of network planning, front-end processors, on-line systems and equipment selection.

Caravan '74 will introduce a new panel area on the third day — operations management — covering project control, performance measurement, small centers and multivendor installation management problems.

Three new subjects will be presented in afternoon open sessions. Personnel is the topic for the first day. Consultant Richard A. Kuehn, president of RAK Associates, Cleveland, will tour all 10 cities with the Caravan to conduct a data communications tutorial on the second afternoon. Packages, problems and advantages related to data base design will be covered in the third open session.

After Washington the Caravan visits Cincinnati, Houston, Anaheim, San Francisco, St. Louis, Chicago, Boston, Charlotte, and winds up in New York.

System Problems 'People-Oriented'

NEW YORK — In the mid-1970s the system professional will have to become a businessman first and foremost.

This was the message delivered to the Metropolitan Chapter of the Association for Systems Management here by John Rhodes, vice-president of Hoskyns, Inc., a New York-based international consulting organization.

Rhodes told the ASM chapter that the success rate of computer systems has been much too low and that computer users will be "less and less willing to accept just anything computer people try to sell them."

"A responding to the environment is the challenge to be saved by systems managers," Rhodes said. "Most problems facing systems managers are people-oriented."

No techniques, minicomputer, memory configurations or similar developments are getting the headlines... no methodologies are being developed, no kind of systems organizations are evolving, he added. Most problems can be traced back to the organization and methods areas. "Productivity has become a key issue," he stressed.

Broad Privacy Review Seen

(Continued from Page 1)

"Another part of the problem is that clear definitions and standards concerning the right of privacy have not been developed and agreed upon," Mr. Nixon said.

He said the cabinet-level review of the matter would delve into "both government and industry practices as they relate to privacy" and would look into the conflicts that "arise and the balances that must be struck between legitimate needs for information and the right of privacy."

DP Aids Ancient Art

NEW YORK — East meets West and old meets new as computers become teaching tools in the art of acupuncture, the ancient Chinese practice of inserting needles in the body to treat ailments.

Computerized mannikins are available with buttons for various ailment symptoms. By punching in a combination of symptoms and the location of the organ, the computer lights up, indicating the point where the needle should be inserted, according to Canadian neurosurgeon Dr. K.K. Jain. There are some 1,000 points for the computer to choose from.

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Vendor Resources, Software Adaptability Important in Package Selection

PRINCETON, N.J.—A source maintenance system is one of the most heavily used software packages a computer installation will ever invest in, according to ADR, the Princeton software house. At most installations, its frequency of use over a long period of time will exceed even that of IBM's compilers and the linkage editor. An equally important consideration, says ADR, is the potential life span of the source maintenance system. Once a computer installation becomes dependent on it, the maintenance package is likely to be an integral part of their operation for many years to come, through all kinds of environmental changes and equipment upgrades, such as S/360 to S/370, DOS to OS, and 2314 to 3330 or 3340 discs. The vendor must have the resources, and the software must have the versatility required to adapt to these changing conditions.

New File Design Developed

ADR's source maintenance system, The LIBRARIAN, has undergone evolution-

ary development since the 15-year old independent software house first introduced it five years ago. Initially it operated under OS and supported tape libraries only; subsequently a DOS version was developed, followed by support for random access disc libraries in both the OS and DOS versions. Recently, a new storage technique known as AFO—Advanced File Organization—was incorporated into The LIBRARIAN. This technique is designed to optimize performance when libraries are allocated to the large-capacity 3330 and 3340 discs. AFO, which required over 3 man-years of development effort, features a "floating directory" which automatically increases its capacity as an installation's storage needs grow. The new technique, which is conceptually similar to VSAM, obviates the need for reorganization or periodic maintenance of direct access libraries.

Facilities for Updating and Backup

The LIBRARIAN provides a number of features for programmers, including

updating commands that operate on complete statements or strings of characters within statements. Programmers can make temporary or permanent changes to a source program and pass either test or production versions of a program to any of IBM's language translators. Facilities are provided to protect against updating an out-of-date or mis-named program, and to prevent redundant application of the same set of changes. All changes successfully applied are summarized and printed in a supplementary report; each statement changed has the date of change permanently associated with it for auditing purposes.

The LIBRARIAN provides facilities for the creation of disc libraries and for initial loading of data into these libraries from cards or from libraries supported by other maintenance systems. Manual or automatic back-up and restoration of libraries is supported, and several levels of security are available for protection against unauthorized data access or modification. Also supplied with

the system is an interface to IBM's TSO; other ADR software products are equipped with interfaces permitting them to directly access data stored under The LIBRARIAN.

The system is installed by ADR field personnel and is available under monthly or permanent licenses which incorporate a 30-day no-obligation acceptance period.

Context Editing Aids Program Maintenance

PRINCETON, N.J.—The ability to make character string substitutions is an important characteristic of any source program maintenance system, according to ADR. All time sharing systems support this feature, and it is equally important in a batch-oriented program like The LIBRARIAN. Character string substitution, or context editing as it is sometimes called, involves searching a file for a designated string of characters, and when located, substituting a second character string for the original. Other characters in a record that is context edited are expanded or contracted according to the relative length of the two strings involved in the operation.

Used in Global Operations

Context editing is highly useful when making global changes to a source program. For example, if a data name in a COBOL program is changed, all procedure division references to that name must also be changed. Context editing allows a programmer to replace all occurrences of the old data name with the new name in a single operation. A summary printout of all records modified by the edit function is produced for verification purposes. In addition to its value in program maintenance activities, context editing can be quite useful when preparing and modifying textual material such as memoranda or narrative descriptions of programs and systems.

Source Maintenance System Nears 1200 Installations

PRINCETON, N.J.—ADR reports that its source program retrieval and maintenance system, The LIBRARIAN, is installed at almost 1200 sites throughout the world, making it the most widely used program of its kind. In addition to sites in almost every state in the U.S., including Alaska and Hawaii, The LIBRARIAN is heavily used abroad. France and Canada top the list of foreign countries with multiple installations of The LIBRARIAN, followed by the Scandinavian countries, Switzerland, and Belgium. The system is also in use at computer installations in Brazil, Japan, and Australia.

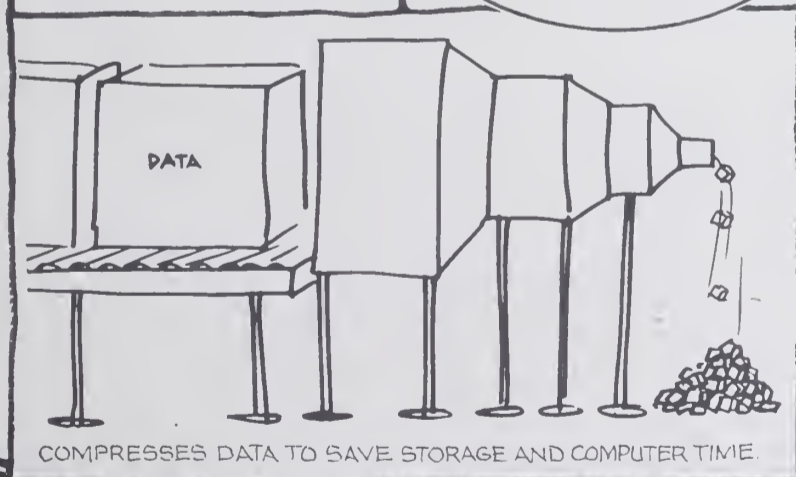
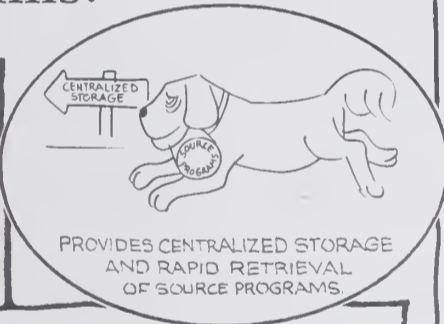
Supports Many Devices

The LIBRARIAN was first introduced by ADR in 1969. It operates on IBM S/360 and S/370 under OS MFT, MVT, VS1, and VS2. The DOS version operates with POWER and GRASP and under DOS/VS. Devices supported include all types of tape drives and 2314, 3330, and the new 3340 disc drives.

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For Users of Consulting Services

Writing Own Terms Saves Time, Confusion

(Continued from Page 1)

can state the individuals and write all subsequent terms as applying to specific individuals, you create a situation in which the consulting firm cannot switch personnel at all. For short-term contracts, this is completely favorable to you.

In longer-term contracts, you must take personnel turnover into account, and write a mechanism for mutual agreement to change of personnel.

You should specify where the work will take place and who provides materials and computer time. Also specify who gives assignments and any controls or acceptance review of the quantity and quality of work.

When and How Much: Clearly state the start date and normal daily hours, your right to require overtime, and whatever advance notice of overtime is necessary on your part. Provide a policy with regard to weekend and holiday work: can you mandate it and what is the billing rate? What holidays are involved (e.g., holidays your organization grants or holidays the consulting firm grants?)

If possible, negotiate a stated amount of overtime which will be performed without extra change per day or per week. (Call this "professionalism" when you ask for it.)

State the normal daily rate and the overtime rate.

A good method of control is to write time sheets, and approval of them as the basis for billing, into the contract. If it affects your bookkeeping, specify when invoices must be submitted.

Cover unavoidable absence to the extent of stating how many days of such absence will invoke your right to terminate the contract.

Favorable terms for you would include an option to grant compensatory time off as a trade for overtime, weekend or holiday work.

Bailing Out and Normal Termination: At the outset, you may want to incorporate a trial period during which you can reject an individual and thereby not be billable for time worked. This is most reasonable if the individual is selected after the contract is negotiated. The right of refusal should be unqualified except by the length of the trial period.

Termination can be handled either by stating the date or, more favorably to you, by

stating that your organization will give at least "X" amount of notice. The latter both protects you in case the project runs over and gives you an automatic "bail out" mechanism which you can invoke, or threaten to invoke, in case of any problems at all. If termination is written this way, the consulting house does not have a legal way to terminate without your agreement.

If there are specific foreseeable losses which could be caused by a consultant's error, then you might want to try to negotiate a mechanism for billing penalties under stated circumstances. But you run the substantial risk here of a legal battle which could cost you some other favorable terms.

Confidentiality, Property, Legal Relationships: You should state your organization's blanket ownership of all products of the consultant's work for you. You

should state that any information which your organization designates as confidential, given to the vendor or the individuals, will not be disclosed to a third party without prior written consent of your organization.

If you have purchased or leased any proprietary products, you should specifically prohibit consultants from removing them or literature pertaining to them from your premises or disclosing any information about them.

Relationship: After the opening statement, which offers an agreement to perform work for you, there should be a disclaimer something like this: "It is understood that neither (vendor name) nor (individuals) will be deemed to be an employee, agent or partner of (your organization)." This protects your firm from any of the obligations or liabilities of an employer.

Legal Review and Negotiation: If you use a model contract, you can probably speed up, if not eliminate, the need for formal legal review of the actual contract in your own organization. Unless your model contains highly unusual or unfavorable provisions, legal review by the consultant should also be a formality. If it is not a formality for the vendor, then either legal review is being used as a bargaining strategy ("my lawyers won't let me...") or you have failed to specify some important part of the obligations between you.

Generally, if you have a model and are confident in the way you use it, it is a great help in getting terms out into the open very quickly.

Marcia Geyer is software support manager, International Nickel Co., Inc., New York, N.Y.

A Consultant Replies

Leave Room for Negotiation

By H.A. Steiner

Special to Computerworld

Marcia Geyer's model contract should work wonders to foreclose any potential consultant game-playing (e.g., staff redeployment, rate increases, etc.), while establishing a professional business-like relationship between both contractor and contractee right from the start.

Because the personal services project tends to be an inherently undefined cooperative venture, it is also to the consultant's best interest that all elements of the arrangement be as clearly spelled out as possible before work actually begins. A business relationship is no good for either party, unless it is a fair one for both parties. On that note, most any reputable consultant firm should accept Geyer's model contract with perhaps the following points being open for negotiation:

- Distinguish between incidental ("professional") overtime and regularly scheduled overtime. The consultant should not be the first one out the door at 5 p.m. nor should he be expected to put in 12-hour days on a regular basis while being paid for eight. A good rule of thumb would define incidental overtime as less than two hours per day or six hours per week. Saturday, Sunday or holidays are always scheduled.

- The user should not have to pay any extra premium or differential for overtime or off-shift work. If the consultant insists on this as his standard policy, check to see if his employees are similarly compensated.

- The best arrangement is for the consultant to receive nearly identical treatment to the client's employees. He should work the same hours, take the same holidays, coffee breaks, etc. In some instances, the consultant's status is held to be inferior (e.g. older desks, stricter

time and progress reporting controls, etc.). In others, consultants are exalted to the displeasure and resentment of the customer's own people. Avoid these extremes — they are both counterproductive.

- Ask for formal written status reports at least monthly.

- Both parties should have the right to terminate the contract without penalty given reasonable notice. The client should give the consultant at least two weeks warning; the consultant should give the client at least a month.

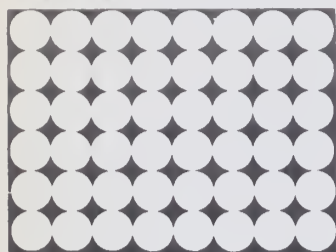
- Avoid "what if" penalty clauses, as they will delay negotiations and undermine mutual respect and good faith. Contracts can fall apart when lawyers start asking, "What if one of the vendor's people causes the building to blow up because of a programming error?" This type of guessing game rarely pinpoints the real areas of risk. Accordingly, the contractor should not be liable for any consequential damages, but should be liable for the worth of the contract for gross negligence or deliberate sabotage.

- The consultant's technical employees are by far his most valuable resource. He will probably insist either on a mutual "no hire for six-month" clause or some sort of agency fee agreement, in case both the client and the employee involved wish to strike a permanent alliance. In any instance, you should not pursue employment discussions with any contractor personnel without clearing it through their management beforehand.

- Lastly, even if it seems to be a small job, have at least a letter signed by both parties detailing the key points as mentioned above, and keep it updated if the terms change. Good contracts make good business relationships.

H.A. Steiner is manager of New York operations, Keystone Computer Associates.

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'At Least Two to Three Years Away'

Treasury May Push Use of EFTS for Social Security

By E. Drake Lundell Jr.
CW Washington Bureau

WASHINGTON, D.C. — A Treasury Department task group report will recommend next month that the U.S. make plans to move to the Electronic Funds Transfer System (EFTS) for most Social Security payments.

Sources close to the department, however, indicated the process of moving to direct payments of such funds to a recipient's bank account is still several years away.

"We're definitely looking for the day when all government benefit programs could be handled electronically," one member of the study team revealed, "but it's at least two to three years away."

Asked about reports that the EFTS would be used as early as this March for the Federal Supplemental Security Income program, the officials said, "March

1977 would be a more likely time."

Under this system, which would be completely voluntary, a recipient could have the government deposit his check with his local bank electronically instead of receiving a check through the mail, much as many companies do now with payroll checks.

The Treasury official said people presently on Social Security can have their checks sent directly to their bank instead of receiving them at home, but individual checks are still made up for each beneficiary, rather than magnetic tapes.

In addition, only about 2,000 of the 25 million Social Security beneficiaries have presently opted for the system, which he admitted had been opposed by the Social Security Administration.

But the Treasury, however, is pushing the program and the soon-to-be-released report will back the direct payment

mechanism heavily, sources here have said.

The most probable course of action — if the Treasury's recommendations are followed — would be to try to expand the

"We're definitely looking for the day when all government benefit programs could be handled electronically, but it's at least two to three years away."

present system that permits an individual's checks to be sent directly to banks for deposit.

If that system were pushed, Treasury personnel maintained there could be possibly three million benefit recipients who would sign up within the next year.

But this still would not qualify as EFTS

since checks would still be made up for each individual in the program.

"But when we get three million or so in the program of direct mailing to banks, then we can start working on an electronic transfer system" where the Treasury Department would not make up individual checks but would rather send magnetic tapes to clearing banks for crediting to individual accounts in other banks, the officials indicated.

The Treasury officials noted there are still many problems with EFTS that would have to be worked out before the government could start such a program, but they indicated their forthcoming report suggests solutions to some of the major stumbling blocks.

The system would probably be first implemented for Social Security checks, and then applied to other benefit programs of the government.

Greendale Finds Old Way Is Best Way

GREENDALE, Wis. — In a switch on a switch, this village has converted its computerized payroll system to a manual process. The move was made in an effort to eventually save about \$1,200/yr, according to Harold Lutz, Greendale's clerk-treasurer.

Lutz said the village had been paying about \$1,200/yr for a standard payroll service from Midland National Bank in Milwaukee, which ran it on a Burroughs 3500. The system had been in operation for about three years, Lutz said. The manual system has been in operation since the beginning of this year.

"It doesn't look like it'll take us any more time to do it manually, for the amount of input our program required," Lutz said. "We had so many variables that required our input that we were spending an awful lot of clerical time just feeding a computer. Then we had to pay \$1,200 on top of it. We imagine that maybe with just an hour or two more a week, we'll be able to do the same thing without spending \$1,200/yr for it," he said.

The initial cost of the manual system will be \$476, which includes one year's supply of checks and two years of record supplies. Thereafter, supplies will cost about \$100/yr.

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Passes Assembly 71-0

Calif. Privacy Bill Would Restrict Data Use, Transfer

By Marvin Smalheiser

SACRAMENTO, Calif. — A personal privacy bill that could significantly impact the handling of personal data in California and serve as a model for other states has passed the State Assembly by a vote of 71-0. It now goes to a Senate committee.

The bill would restrict the use and transfer of personal data used by computers in automated personal data systems.

It would impose fines, imprisonment and civil penalties on operators of computer systems for unauthorized invasion of an individual's privacy, improper dissemination of personal information or failure to file a public declaration of the existence and nature of a personal data record system.

Representatives of the Western Electronic Manufacturers Association's (Wema) Computer Software and Services Group (CSSG) met recently to discuss how the bill could be amended to prevent potentially serious operational problems.

Bryan Wilkinson, president of the Los Angeles Chapter of the Data Processing Management Association (DPMA) met with the Wema group and sent a letter to Los Angeles area DPMA groups about critical provisions of the bill.

The Association of Data Center Owners and Managers (Adcom) in Los Angeles is also studying the measure.

The bill is sponsored by Assemblymen William T. Bagley (R-San Rafael) and Mike Antonovich (R-Glendale).

It faced a number of delays in getting out of committee in the Assembly and out of the Assembly. Its fate in the Senate is problematical, depending on how the bill is amended.

But Bagley, the original sponsor of the bill, is believed willing to amend it to get it passed in a workable form — faithful to the original intent.

James Case of Dylakor Computer Systems, chairman of Wema's CSSG, said the group agrees with the intent of the bill.

Objections to Bill

But, he added, it does not, in a practical way, differentiate between hardware and software systems.

"We will recommend a change in the wording or clarification so we can live with the intent of the legislation," he said.

Wilkinson said there would be problems in transferring data out of state because the bill prevents identifiable personal data from being transferred to another system without insuring that equivalent security is in effect.

This, he said, could create a problem for the transfer of deductions and other tax information from one state to another.

Eben Tisdale, Wema vice-president, said the bill makes no distinction between

computer files developed by employers to assist them with in-house operations and those files developed by companies in the sale of data.

The overall bill, he said, should be more flexible.

"We have no basic objection if it is limited to where the abuses are."

Matthias F. McDonald, executive director of the state intergovernmental board on electronic data processing, said the board has reviewed and endorsed the bill.

The board represents state, county, city and educational segments of the state government.

What the Bill Requires

The bill would make some of the following requirements of operators of automated personal data systems:

- Inform, in writing, every individual asked to supply data whether he is legally required to supply the data.

- Assure, in writing, that no use of the data is made beyond the stated purpose of the system.

- Allow an individual to contest the accuracy of the data concerning him.

- File with the state Department of Consumer Affairs each year a public notice about the system and actions taken to safeguard the data.

- Make no transfer of individually identifiable data to another system without prior consent from the individual

concerned.

- Take reasonable precautions to protect data from unauthorized use.

- Maintain data in the system with such accuracy as to fairly reflect an individual's current qualifications and characteristics.

Penalties include a maximum of \$10,000 for failure to file the required annual public notice with the Department of Consumer Affairs.

Violations of other sections of the act constitute a misdemeanor, punishable by a fine of not more than \$500 or imprisonment of not more than six months or both.

There are also provisions for injunctive relief.

Opposition to Bill

Opposition to the bill has come from the California Bankers Association, the Association of California Life Insurance Companies, TRW Credit Data Corp., the state Department of Motor Vehicles and the Associated Credit Bureaus of California.

A spokesman for Bagley's office said "no one is too anxious to stand up and be counted on this one."

The bill, he said, had a 70% chance of being killed in the Senate as it now reads but it depends on the committee to which it is assigned.

Packet Switching, Boon or Bane?—Part II

Satellite Systems Endangered?

By Alan Taylor

Special to Computerworld

Although the currently proposed packet-switched networks will be charg-

ing their customers the same rates regardless of the distance their data is sent, the costs of the services to the network do in fact depend on distance. In effect, this means subscribers who do not make much use of long-distance cables will be overcharged, while heavy cable users will be undercharged.

The danger in allowing this type of tariff may well be to discourage the development of truly distance-independent communications systems, such as satellite systems.

With satellites, there is no real destination for a signal or a message beamed up to it. The data is broadcast by the satellite to all earth stations in the network. All of the stations pick up the signal and examine it to see if they are supposed to forward it to anyone from their particular station. The cost of transmitting by satellite from station A to station B, therefore, is independent of the distance between the stations and is related only to the cost of the stations and satellite system.

Given enough stations, few computer users would be more than a local telephone call away from one of the stations, so any satellite-supported communications system which relied upon local telephone links and satellite service would be truly distance-independent except within the local area.

At present, only one of the major packet companies — Telenet — has any plans for satellite communications, and then only four stations in the 48 continental states are being proposed. The normal packet user, depending upon geography can easily require the use of 1,000 miles of terrestrial channels, which do have a fundamental distance-related cost.

But the distance-independent charges proposed by the packet nets encourage unnecessary long-distance communication at the cost of the smaller users of terrestrial cables. The requirement for multiple paths (for safety purposes), which is sometimes used as a justification of these charges, seems to have no real validity, as similar paths on developed networks are not necessarily more than about 50% longer. (There is no need for most of the messages between Boston and Washington

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Terminal Connection	Paid by Customer	Paid by Customer	No Change
Quantity Discount	Up to 88%	None	Additional Charge

Comparison of Telenet's Old and New Proposed Tariffs

to be routed via Los Angeles, even if New York is temporarily closed down, for instance. They can be sent via Philadelphia instead.)

Currently, however, there is no indication that the packet-switched networks are prepared to abandon the concept of charging the same for a call across town as they are for a call across the country. Telenet's vice-president Stuart Mathison claims the reduction would only be about 10% to 15% at most and therefore is unimportant.

Nets Drop Discount

(Continued from Page 1)

computer, so that a dual computer complex would only get a discount on the amount sent out by each computer separately. "We found it wasn't practical," he said.

The new Telenet schedule also provides uniform treatment of computers and terminals, which had previously been treated differently.

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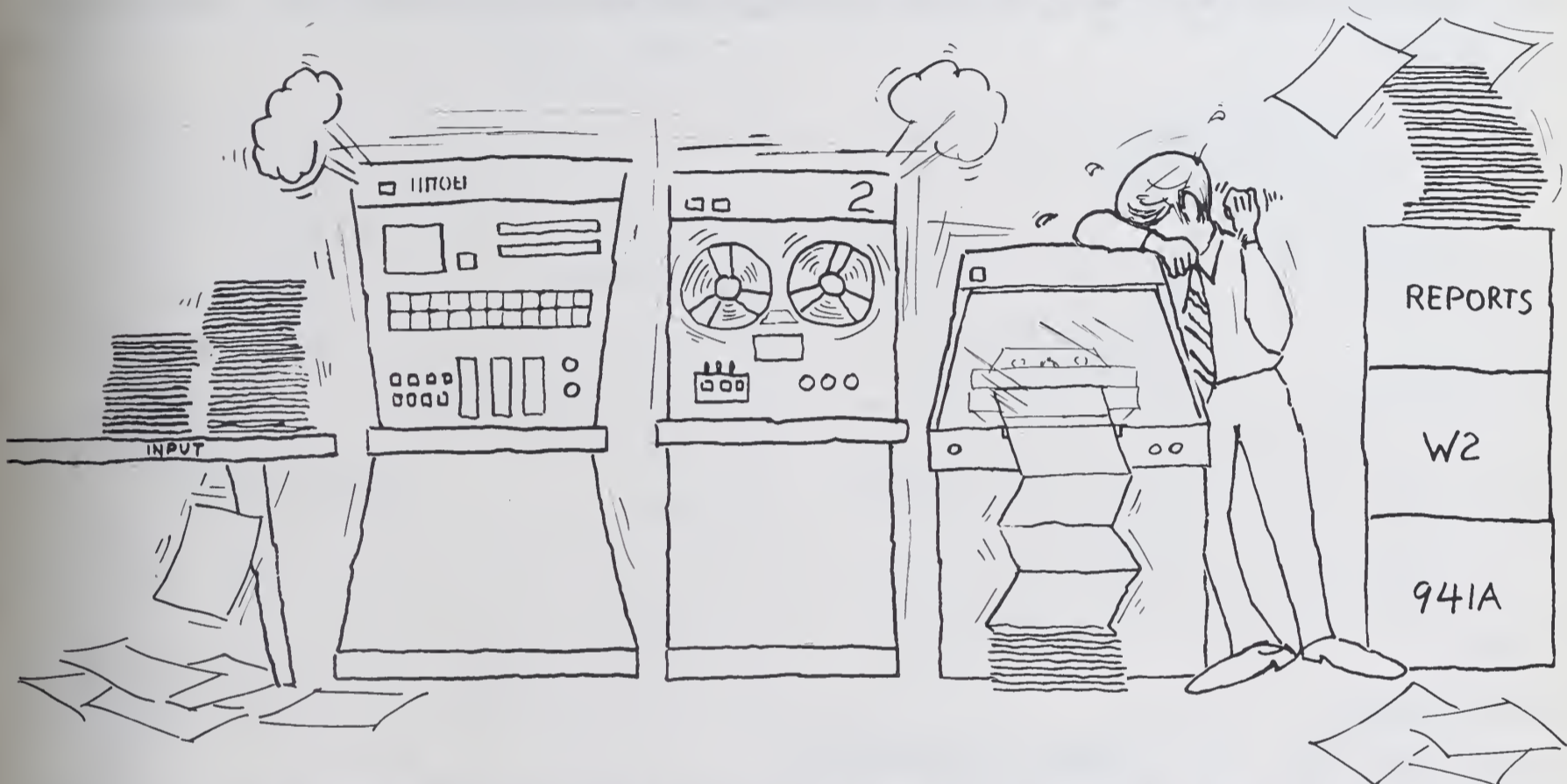
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Protection Needs Depend On System's Complexity

DP security is a complex, interactive mix of physical, procedural and data protection, with a healthy amount of backup and audit.

This series gives an overall look at the security responsibilities of users and vendors, defines the threats to security and analyzes in detail protective measures to minimize security risks.

It is generally agreed that some form of security is needed in every installation and that a mix of safeguards is probably a good approach. But the amount of protection each user needs depends on the sensitivity of the data, reliability of users and complexity of the system.

Let's discuss the sensitivity aspect first. There is a major difference between an installation processing a top secret war plan and one processing policy records belonging to insured people. In general, one does not need to safeguard commercial installations as if they were military camps.

Also, there is a difference in the amount of protection one would put into a computer in-

stallation located in the middle of the Philadelphia ghetto as contrasted with conservative Podunk, Iowa.

However, the major factor in providing protection is that of complexity. In today's environment computers are sharing data, programs and systems. They are processing many jobs at once. The greater the extent of resource sharing, the greater the need for security.

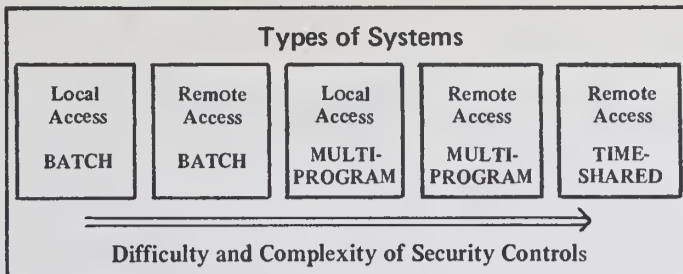
There is also a difference in protection requirements depending upon how much capability is

Part V How Much Protection?

given the user. If the user can only interface with the data by means of a predefined, controlled access inquiry system, there is less of a problem than if the user were able to write and execute his own programs at a terminal.

There are other factors. Industry in general is integrating more and more applications. More departments are sharing data. The owners of the data have a right to be concerned about its integrity and its disclosure. The computer is even more critical to corporate and institutional health.

There are a couple of security axioms that apply to protection of the computer. They are useful in viewing almost any aspect of this complex and fascinating subject.



As the complexity of the system increases, so does the amount of control needed to adequately secure the operation.

First of all, there is no such thing as 100% security. Many people will claim they want an all or nothing approach to security, and that a half-way type of protection is worthless. This is not true. In every security installation in the world there are loopholes.

Yet all is not lost. Lesser protection is very cost-effective and would work. The ideal security goals are to increase the work factor for one to deliberately disclose, destroy or modify data, or to reduce the odds of an accidental problem.

Consider a building with a guard at the front door and all other doors locked. Let's assume this type of security will keep out 90% of all possible intruders; 10% will get through.

Then consider another ring of different protection around the computer floor. Again, let's assume 10% of the individuals who got by the building guard can break this floor protection. We are down to 1% infiltration.

Then finally let's assume computer room protection will again keep out 90% of those who get through. Now, we can keep out 999 out of 1,000 would-be intruders. These are worthwhile odds.

Part VI will look at the risk management approach to securing operations — a systematic method for identifying and reducing security threats.

Peter Browne is manager of the security operations, General Electric, Information Services Division, Bethesda, Md.

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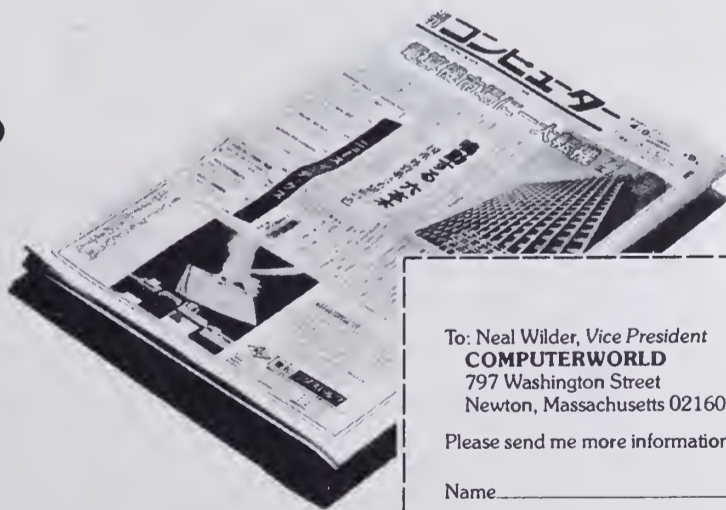
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Sketches Made From Photos

Anyone Can Draw 'Whatisface'

By Toni Wiseman
Of the CW Staff

TOLEDO, Ohio — "I wanted to demonstrate an aspect of artificial intelligence where the computer is in a sense augmenting a person's natural talents."

That is why Ohio State University doctoral candidate Mark L. Gillenson designed "Whatisface," a computerized facial compositor.

"Whatisface" enables a non-artist to make a sketch of a face from a photograph in front of him.

'Home-Grown' Language

The program is written in Graphics Symbiosis System (Grass), a "home-grown" higher-level interactive graphics language, which in turn is written in PDP/11 Assembler, Gillenson said.

"Whatisface" consists of 170 routines in Grass. Each routine consists of anywhere from five to 70 statements and those routines are nested sometimes to a depth of as much as 10, according to Gillenson.

The task of sketching the face is split into four subtasks — the machine handles two of those and the operator handles two.

"The machine provides a heuristic strategy on how to build a face with prestored facial features," Gillenson said.

"The two operator tasks consist of making visual decisions in terms of comparing what you've actually done with what's on the screen," he said, "and the actual physical ability to manipulate analog dials to stretch things and move things around on the screen when the strategy tells you to."

The artist's "canvas" is a Vector General scope. The program begins by flashing an average male Caucasian face, mathematically calculated from 256 photographs, onto the scope.

The system then leads the operator through a variety of op-

erations ranging from an aging process to a stretching process to obtain the gross shape of the face.

"Then you can go into a manual mode," Gillenson said, "using our analog devices, which include binary function switches and dials, for fine adjustments," such as warping a hairline.

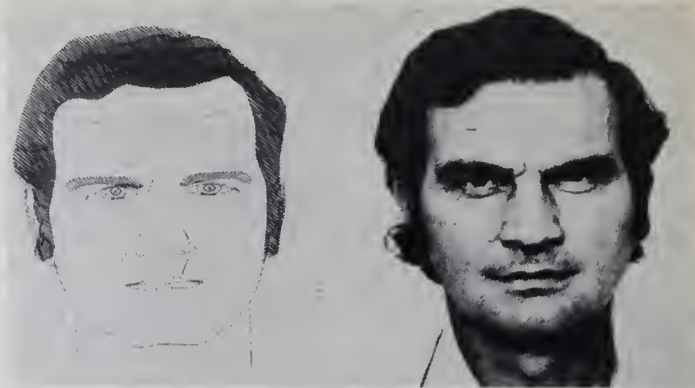
This is followed by a hierarchical manipulation routine, which, he said, has some elements of the concept of picture grammar. Then each feature (eyes, nose, hair, lips, etc.) is

retrieved in sequence, and tailored to the operator's specifications.

The final step entails making the hair straight, curly or wavy and shading in the eyebrows and eyes.

The possibilities for the system in police work are readily apparent and Gillenson has already been in touch with several agencies; however, he cautions that at present it is not set up as a police tool.

"At this point the sorts of



The sketch on the left was made from the photograph on the right using the "Whatisface" system.

questions asked tend to be extremely detailed, and that's okay because you're working from a photograph," he said. "But if you're working from someone's

memory, the questions can't be quite as detailed. And various other aspects of the strategy would have to be severely modified," he concluded.

To enter data is human. To ENTREX it, divine.



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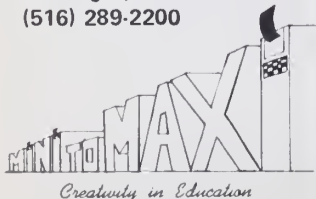
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Finding the Optimum Work Schedule — Part II

Operations Staff Attitude Key to Overall Success

By Jonnie Sears Jr.

Special to Computerworld

Most computer operation inefficiencies are caused by poor scheduling and underutilization of the hardware. An operation section can make or break a DP center. It can be a bottleneck or an efficient production line, assembling a center's total EDP effort into a tangible product.

An experienced operator can usually help pinpoint problems and minimize the tendency of a supplier to pass the buck. Obviously, the attitude of our staff is

a major ingredient to our overall proficiency and continued growth.

In Cincinnati the Regional Computer Center's costs are lower, and we are getting better utilization of our resources. We have been able to decrease our hourly hardware cost by operating seven days per week, around the clock, because our hardware rental agreements call for a fixed monthly fee regardless of the number of hours we operate our systems.

Usually we schedule long print

The rising cost of data processing is causing revolutionary thinking for many DP managers. As the cost for equipment, personnel and supplies continues to increase they must constantly devise means of getting more utilization from their equipment. This two-part series details how one center succeeded by converting its work schedule.

jobs and special test shots for the weekends. This allows our operation section to provide

better turnarounds on weekdays, as well as alleviate a lot of the scheduling conflicts that would normally occur during the course of a week.

Each of our four teams has a complement of five persons — three computer operators, a lead operator and shift supervisor responsible for his team's performance as well as the computer center's overall security during non-prime time. Our night operators are paid a shift differential rate of 20 cent/hr. There is never any need for overtime

because we have an adequate complement on duty at all times.

Holidays are handled quite easily with no disruption to the schedule. If a holiday falls on a person's scheduled off day, he receives an extra day off at a later date. Those whose workday falls on a holiday receive 16 hours extra pay for working.

Over the course of a year, the holidays usually fall on each cycle about 50-50. Normally the workload for a holiday is very light, thereby allowing us to decrease our work complement to three people instead of five.

Team Balance

A balance of skill and experience is maintained on each team with a continuous training and evaluation program. We found, by virtue of our work schedule, that certain production jobs, scheduled to be run biweekly, would automatically be run by the same team. This, of course, provided as many good features as unwanted problems (like specialization). To offset this, we have on occasions switched operators from one team to another. However, the switching has always occurred between either the two night teams or the two day teams to minimize disruption to personal plans.

We have been able to enhance the overall proficiency of our computer operation staff by the following methods:

- In providing a work schedule acceptable to the operator as well as management, we have increased the morale and performance of our staff.

Acceptance has been fantastic. We only lost one person when we made the initial switch.

- We promote professional attitudes by providing career opportunities within the operation section.

Jonnie Sears Jr. is assistant supervisor for operations for the Regional Computer Center in Cincinnati, Ohio.

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While you're thinking about clean data, we suggest that you validate our batch of claims. A contact with somebody you know at one of the more than 200 ENTREX installations would be human. A call to one of our representatives would be divine. ENTREX, Inc., 168 Middlesex Turnpike, Burlington, Mass. 01803. (617) 273-0480. **ENTREX**

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Editorial

Good News Week

Aside from being victimized by the energy crisis, computers are doing quite a bit for the public good.

Much has been written about problems computer users could experience during the power brownouts they are now experiencing because of fuel shortages.

Even more has been written about the merits of carpools, with data bases searched by computers.

A vendor is now providing a computer program, free of charge, to any organization that wishes to use it to implement a carpool.

Burroughs says the program runs in only 20K bytes of memory, is written in ANS Cobol, and can run on any system with a standard Cobol compiler.

After weeks and weeks of carpool stories and, to be sure, of municipalities and organizations reinventing carpool programs, hopefully this plan will put an end to much of the duplication (and therefore to much of the publicity) surrounding these efforts.

Equally impressive, and possibly more significant, is the Fuel Users' Emergency Line, appropriately nicknamed "Fuel," now in use in Pennsylvania.

Believed to be the country's first computer-assisted emergency allocation system, Fuel helps state officials react to emergency situations concerning oil allocation.

And, like the carpool program, the Fuel software is available to agencies in other states.

After all the negative publicity about data banks and invasions of privacy, blackouts and brownouts, real or contrived energy shortages, it's nice to hear a little good news, too.



'Migod! What If They Learn How to Do Payroll?'

Letters to the Editor

Artificial Intelligence— A Comparative Look

I like to think of artificial intelligence in a couple of ways:

(1) As affording a comparison with human intelligence, which is as instructive as most comparisons, but will grow more instructive as time goes on and the theory is taken seriously. To me the comparison is chiefly useful because of questions it raises

about human intelligence in a new way.

e.g. Why is the human capacity for quick recognition and rich association so much greater than the capacity as yet developed for dealing carefully with complex logic in statements. (To start with, the answer is evolutionary, but today's complexity demands new evolution, and will favor new neural abilities.)

(2) As covering that area of information research where human successes are as yet impressive compared with the machine's. We must not forget that character recognition, checkers playing, certain decoding problems, etc. were "artificial intelligence" until they were shown feasible. Anything successful and understood gets immediately legislated out of the field. Should anyone be cursed for trying what's harder?

A.I. researchers do share a temperamental optimism or foolhardiness, but their life is no duller than that of most researchers, if they can find a grant!

The numbers attending each successive international joint conference on A.I. testify to the great challenge the topic seems to arouse. And I must accept some responsibility for encouraging all that.

Otis Minot

Lexington Research
Lexington, Mass.

'Building' vs 'Blasting'

Alan Taylor, CW's Ralph Nader for Cobol, rates an "E" for effort, but "F" for facts.

For example, long before Alan blasted Grace Hopper [CW, June 27, 1973] for Cobol standardization dereliction, Grace at the Pentagon was busy building the structure and gathering the parts that became the Ansi standard Cobol compiler tests Alan joyfully proclaimed [CW, Jan. 16, 1974] as good stuff for users.

Unbeknownst to blast-first-and-ask-questions-later Taylor, Hopper was doing the good work Taylor never does by blasting. Hopper approaches problems positively and persuasively.

She's a builder. When Taylor blasts, there's a growing tendency in these parts to tune him out. We hope he's not too old to change his ways. Active USNR Captain Grace M. Hopper's current Pentagon kick, we're told, is promoting a standard Cobol language sub-set for minicomputers.

Richard M. Petersen

Scottsdale, Ariz.

"Standard" is a very tricky word. Grace is building tests for Cobol compilers, not Ansi-standard tests and not tests for the Ansi-standard-Cobol. And she is promoting a subset of the Ansi-standard-Cobol, not a standard subset. HG

...By the Numbers

If the news media are to be believed, a principal reason for the inability of the government to provide adequate direction and control during the apparent fuel oil shortage is lack of information.

Taking past practice by government and industry as ample precedent, we in the information business already have an available solution:

Assign a Social Security Number to each fuel oil storage tank!

Monroe Fein

Pacific Palisades, Calif.

Herb Grosch: For...

I am writing to you both to cast my vote for Herb Grosch in the event it comes down to vote or whatever and to vote against W.L. Thomson! I am particularly irritated by the letter from Thomson. I am a professional in the DP field and I do not want the W.L. Thomsons deciding what I can or cannot understand.

Thomson seems to think that Grosch is unprofessional, whatever that means. Well, I disagree with Thomson and support the continued publishing of whatever Grosch has to say.

Wayne Frederick

Los Angeles, Calif.

...And Against

Re William L. Thomson's letter to the editor in the Jan. 16 issue concerning Herb Grosch:

AMEN!

Dave Tierney

Boston, Mass.

A New Kind of User Group — I

Let me carry you back to the early days of Share, when there were less than a hundred member installations, when Rand and Douglas Santa Monica and the National Security (shhh!) Agency knew more about how to organize a 701 or 704 shop than anyone in IBM, even Cuthbert Hurd; when Poughkeepsie was young, and even Endicott was only middle-aged. Simpler, happier times: managers argued about open versus closed shops, whether to teach Fortran to their customers, how to steal programmers from each other. IBM was a given, the only game in town — oh, out in New Mexico someone had ordered an I103 B with floating point, and LEO was keeping track of sausage rolls in London, but mainstream for aerospace and Generous Electric was IBM.

We will see something like that in the late fifth generation, say 1979. More than 20 years will have zipped past; no customer, not even the National Security (still shhh!) Agency, will know a fraction as much as IBM, and Share and Guide will have many thousands of member installations. But in the sense that, again, IBM will be the only game in town, history will repeat itself. It will be IBM against the customers, an unshackled Gulliver against an antheap of Lilliputians, a nervous elephant dancing amid a horde of skittery mice.

Back in the Fifties, the mice organized. They realized IBM was uncertain, realized they represented the future — the cloudy, non-square-hole future — to Tom Watson and his father, realized they had intellectual as well as commercial leverage. Thus was born the 709; thus was born the first operating system (at least in name): SOS, the Share Operating System.

It was a fiasco.

IBM did not resist, did not sabotage, did not starve out the project. But Gulliver could not respond eagerly and flexibly to a non-Watsonian concept; did not want to.

Partly as a result, partly because of the Peter Principle, Share and Guide devolved into gigantism and powerlessness. And alert IBM, wary of a repetition, set about capturing and utilizing the organizations; helped perpetuate them through the 1964 interface between second-generation machines and the 360; fed both practical and arcane information into them; supported them with services and socializing. The relationship was comfortable for both sides. What had begun as a pressure group, a lobbying organization of tough-minded customers, became first a self-help specialized technical exchange and later a mutual admiration society. Share, that is: Guide, which started considerably later, never really intended to beat on IBM at all.

USE, the Univac Scientific group, and the Honeywell and Burroughs and Control Data and ICL equivalents, are not Share, nor are the parallel business-oriented user groups as lush and corrupted as Guide. But they will dwindle as IBM dominance becomes more obvious. I hope to persuade readers of this column that we need and can have a new kind of user organization; it will have to replace or coexist with Share and Guide. The others don't count.

This is the first of a series of columns. The next will describe the objectives of the proposed organization.



Herb Grosch

Recruiting DP Personnel —Part II

Proper Screening, Interviewing Filter Candidates

By Lou Fried

Special to Computerworld

Once a pool of potential candidates for employment has been established, the firm must screen the applicants before setting up in-depth interviews.

If the organization has a personnel department, it should be used. Not just because the personnel department objects if it is bypassed, but because it can provide several valuable aids in the recruiting process, including preliminary screening.

The personnel recruiter who is assigned the preliminary screening should be carefully briefed in person to make sure he knows exactly what to look for. He should not be expected to do any technical screening unless he himself has a technical background.

The list of requirements or

"preliminary screening level" should be set so as to accomplish the real purpose. For example, if the purpose of preliminary screening is to eliminate all but a specific narrow range of applicants, then only those few resumes passing the preliminary screening will require final review. On the other hand, if several openings exist at various levels the screening level should be defined in broader terms and the resumes classified into specific ranges.

One danger in setting too tight a screening level is excluding the possibility of serendipitously locating a talent you might be able to use in another position.

Give Tests Fairly

If preemployment testing is used there are certain ground rules to follow. Preemployment

tests must be validated by the Equal Employment Opportunity Commission and the same test should be given to all applicants for a particular position.

Tests should evaluate only

Finding and hiring the right people for DP jobs is one of management's most important jobs. This series looks at ways to find, screen and interview candidates, make the final offer and introduce the new employee to the organization.

technical ability required for the position. (This obviously could include even a vocabulary test if it is required for the position.) So-called "personality tests" and IQ tests are coming under increasing fire for being ethnically biased.

All test results and interview

records should be retained for several months after the interview.

Many employers are concerned about potential problems with the EEOC. The easiest way to avoid these problems is to avoid discrimination or any appearance of discrimination in testing and interviewing practices and to develop a history of equal employment practice. It should be remembered that testing alone is not a defensible method of selection.

Final screening of applicants should be done by the person to whom the employee will report. Frequently it is beneficial to have two equally qualified persons review the same set of resumes to catch anything that may have been missed.

Interviewing is a very subjective process. Many books have

been written on the subject but it still remains a mystery to many managers. As a result, they haphazardly develop approaches which frequently do not accomplish the purpose of selecting the most desirable applicant. Even considering that interviews may be applied with the individual manager's distinctive flair, some general rules should be followed.

The interviewer should prepare in advance a list of questions that will aid in determining whether the applicant is qualified for the position.

If several people are interviewed for the position, a written record of the quality of their responses and the interviewer's general impressions should be kept for comparative analysis before final selection.

The applicant should be provided with clear directions for getting to the interviewer's office and someone should be prepared to meet the applicant. A prospective employee's first impressions may determine whether he is willing to work for the organization. A specific time should be set aside for the interview and it should be conducted in an environment where there will be no interruptions or disturbances.

If the applicant is qualified and is to be seriously considered, he should be told about the job, who he will report to, what he will be expected to do and how his performance will be measured. He should also be shown the facility where he will work and any questions he may have should be answered.

Only in rare circumstances should the applicant be made an immediate offer. If there is serious interest, the applicant should be informed by the personnel department about the company, its business and the employee benefits available.

Part III discusses making the offer and introducing the new employee to the organization.

Lou Fried is vice-president, MIS, Title Insurance & Trust Co., Los Angeles.

No Second Chance to Make Right Decision

By Miles Benson

Special to Computerworld

Once upon a time there was a budding aerospace project with a problem. The problem, simply stated, was this: For its onboard avionics computer, should the project define and build a special-purpose computer, or use a hardened and ruggedized but otherwise identical version of a commercially-available computer?

The special-purpose people said, "Our project is unique and we must define a computer tailored to our unique requirements."

The ruggedized commercial people said, "There's nothing so unique in our project that it couldn't be handled by a general-purpose commercial machine much more cheaply."

Well, the leaders of that budding aerospace project scratched their heads over the problem and finally decided that their project really was unique — even uniquely unique — and so they contracted with a special-purpose computer specialist to buy a (you guessed it) special-purpose computer.

Some of the ruggedized commercial people were a bit bitter over that. You see, during all that head scratching, the project leaders had contacted the special-purpose computer specialist and relied heavily on him for their decision. In fact, and this does seem incredible in retrospect, that specialist even helped write the requirements specifica-

tion which defined the computer the project needed. It was sort of like asking General Motors to help you define the requirements for your next sports car, while proclaiming that the decision was not at all necessarily to be a Corvette.

But once the decision was made to get a Corvette — er, a

The Project That Failed

special-purpose computer — the ruggedized commercial people decided to be good losers and set about to make the project work.

And work it did. Oh, it was more complicated than it might have been. Like it was necessary to build a simulator for the special-purpose computer in order to check out computer programs before the special-purpose hardware was delivered. And it was necessary for programmers to learn to write code for the special-purpose machine, even though they already knew how to write code for the commercial computer they might have used.

No Sour Grapes

But good sports will be good sports. The ruggedized commercial people worked as hard as anyone to make the project a success. And they succeeded.

Still, in the backs of their minds they remembered the economies they might have had. They spent money on the simu-

lator, and the retraining and paid the learnings curve price, and wished that all of that had not been necessary.

Government Wonders

The story is not over, however.

It came to pass that the people at the highest levels of government who decide who spends how much for what and work in a large building called the "Octagon," began wondering about all the money they had said people could spend on things like aerospace projects. And the more they wondered, the more concerned they got.

Somebody in the Octagon discovered, while looking through some dusty files, the ruggedized commercial people's proposal for saving money. "Why not," he said silently to himself, "find out whether we can still save all that money?"

And so he wrote to this aerospace project's management and said, "How much money can we save now if we use the ruggedized commercial approach?"

The ruggedized commercial people were ecstatic. Their position appeared to be vindicated. They whipped out their collective slide rules and began an analysis from a now point of view of the cost savings.

But their hearts sank. The simulator money had been spent. The retraining was complete. The learnings curve price had been paid. The code for the special-purpose computer was, in fact, nearly all built.

There was no money whatsoever to be saved now. In fact, the cost to convert special-purpose computer code to ruggedized commercial would be much higher than the original savings in going commercial.

In short, there was no economical way to get there from here.

The original decision was irreversible.

The moral of this story is somewhat obscure. Perhaps it could be, "If at first you don't succeed, you might just as well forget it."

Is Blue Shield's Claim Form System A Problem of Ignorance Or Arrogance?

About a year ago Paul G. Bostley, Blue Shield's vice-president of claims administration, said Blue Shield's new system of claims processing would provide a single "explanation of benefits paid and rejected" when it was implemented. His comments came after the then current system had been critiqued in the Taylor Report [CW, June 7, July 19, 1972].

At the time, I asked to see the draft forms to review them, but was refused.

Now, a year after implementation was expected by Bostley,

the new system is in operation. I don't think much of the result (see Page 14).

Technical Problems Abound

The items I don't like in the form design are:

Improper Error Control — The form is a single part one, but when the recipient has a question, Blue Shield wants the questioner to return the actual form, thus taking his only record of the system. A person is surely entitled to his copy, and some easier form of reference is possible.

Use of Unexplained, Apparently Unnecessary Numbers — Throughout the form odd numbers appear with no explanation. The numbers 91573 and 064008 appear in the line item main position, and 514418874 is at the top. FR045 80 is in the Total line, and

00303/00476 is at the bottom, again with no reference.

Use of Unnecessarily Small Printing — The address and telephone number of Massachusetts Blue Shield on the top of the form is printed on a fine green-dotted background in about the smallest typeface I have ever seen. The codes for place of service and type of service are also far too small to be easily read. In both cases there is plenty of room available even without form redesign to print them in a reasonable size.

Use of a Confusing Asterisk — The asterisk in the Patient Balance column may refer to the 10.00 figure in that column, or to the 22 figure in the previous column, or both.

Use of Undefined Codes — The Disp Code is not explained.

Failure to Use Spaces Available (Continued on Page 14)

Letters to the Editor

Cobol Compiler Tests Aided by Vendors

Re Alan Taylor's Jan. 16 column on Cobol compiler testing:

We have some dozen compilers in various stages of testing, but this does not come near to constituting 80% of commercial Cobol compilers.

IBM has issued a Version 3 of its full ANS standard Cobol, and a Version 4. Both have indeed resolved many of the problems we found in Version 2.

Any plaudits given out should include the vendors. Their reaction to our efforts has been positive and constructive, and is making a significant contribution to the success of our activities.

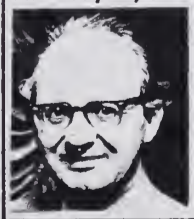
Thank you for the encouragement.

Paul Oliver
Director, Software Development
Div. and Federal Cobol
Compiler Testing Service
Department of the Navy
ADP Equipment Selection Office
Washington, D.C.

The Taylor Report

By

Alan Taylor, CDP



514418874


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Wrong Name - No explanation of action is given, just a statement.

Unexplained Codes

Unexplained Numbers

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MO	DA	YR	PLACE TYPE							
10	22	73	DMSU		2000	1000	1000	22*	1000	B1
FR045 80				TOTALS	2000	1000	1000		1000	

BE SURE TO READ IMPORTANT INFORMATION BELOW AND ON THE BACK OF THIS NOTICE

CODES FOR PLACE OF SERVICE
OF - OFFICE OR LAB
HO - HOME
IH - INPATIENT HOSPITAL
OL - OTHER LOCATION

CODES FOR TYPE OF SERVICE
MC - MEDICAL CARE
CO - CONSULTATION
AN - ANESTHESIA
OB - OBSTETRICAL
SU - SURGERY

CODES FOR TYPE OF SERVICE
AS - ASSISTING SURGERY
AF - SURGICAL AFTERCARE
EN - ENDOSCOPY
LP - LABORATORY/PATHOLOGY
PO - POSTOPERATIVE CARE

RT - RADIATION THERAPY
DS - DENTAL SURGERY
OH - OTHER HEALTH SERVICES
SP - SUPPLIES
OR - DIAGNOSTIC X-RAY

*** SEE REVERSE**

ALAN TAYLOR
633 CENTRAL ST
FRAMINGHAM MA 01701

**THIS IS NOT
A BILL**

00303/00476

Error Control - Why should form be returned?

Remote Definition - Why isn't balance explanation given on front of form?

Floating Asterisk - Which figure does it reference?

Unsupported Balance - Why should Blue Shield approve this just because it's been claimed?

The new Blue Shield claim form illustrates a DP problem. Can you spot the unexplained error? (Note: Approximately four inches of white space on the original form was eliminated in this reproduction.)

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Is Blue Shield Ignorant or Arrogant?

(Continued from Page 13)

to Avoid Codes—There is plenty of room on the form for fuller (over two characters) explanations of type of service and place of service. These could be brought into the line item in an easier-to-read manner.

Failure to Use Nearest Available Space for Explaining Codes—The B1 code on the Balance column is one of only two versions, and is explained on the reverse of the form. There is room to print two additional lines on the front of the form.

For the most part, these problems are matters of poor design. What I find quite incredible—ignorant, or else regrettably arrogant—is that the “explanation

of benefits paid and rejected” promised by Bostley is simply not present at all.

Factually, the claim nowhere specifies (or explains) for what the doctor claimed \$20. Was it for pulling a tooth? Or for giving an injection? The firm doesn't say, so the patient has no idea whether he actually received the treatment claimed.

Moreover, the policyholder cannot know whether the insurance company is paying the approved scheduled rate for the service concerned, again because the form gives no explanation of the service involved. All it gives is the amount Blue Shield paid.

The so-called balance (here, a surcharge of 100%) that is pro-

duced is simply a difference between a claim and payment. This could well involve a mistake (say between \$20 and \$2,000).

Why a policyholder is told to pay an amount when a doctor may have overclaimed to Blue Shield is beyond me. It should be beyond Blue Shield also.

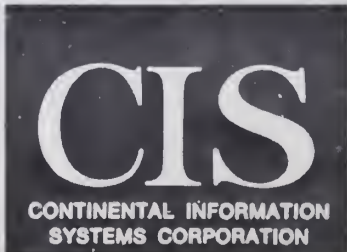
In regards to the other error that can be seen on the form, I leave that for the reader to find. Suffice to say it is both CENTRAL-ly located and differentially missing! Good hunting!

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Delivery Schedules

370/158 Model J, J1 or K

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#2 Delivery 3/22/74
#3 Delivery 4/19/74
#4 Delivery 4/19/74
#5 Delivery 5/17/74
#6 Delivery 5/17/74
#7 Delivery 6/21/74

370/168 Model K

#1 Delivery 4/19/74
#2 Delivery 5/17/74
#3 Delivery 6/21/74

Bits & Pieces

Keypunch Course Guarantees HS Graduate Will Finish

CHARLOTTE, N.C. — Teaching high school graduates to become competent keypunchers has taken a major step forward with the announcement by Cardinal Associates that its 12 cartridge audio-visual training package guarantees 90% of the qualified trainees will achieve at least 90% of the course objectives. One of the qualifications, however, is a 40 word/min typing speed.

The student will attain at least 9,600 keystroke/hr in 24 to 30 hours of individualized instruction, according to Cardinal.

Basic keypunch proficiency is reached in less time. The method of training is "hands-on" which enables the student to learn and demonstrate achievement. Students learn on their own with almost no supervision. An instructor makes strategic progress checks to administer the program successfully, Cardinal noted.

Cardinal Associates is at 427 E. Morehead St., 28202.

100 Char./Sec Printer Handles 132 Columns, Priced at \$2,600

HUDSON, N.H. — Centronics' 100 char./sec impact printer, designated the Model 500, uses a 5 by 7 dot matrix and prints 132 columns. The company offers a range of interfaces and options which allow the \$2,600 printer to be styled for specific applications. Capable of producing an original and four carbon copies, the 500 can operate with the paper supply located to the rear or below the printer. The character set can be increased up to 128 characters as an option.

The standard mode produces a line of elongated boldface characters on command and an optional feature allows the 500 to elongate a single character. The 500 is plug-to-plug and software-compatible with all other Centronics printers.

The company is located at One Wall St., 03051.

Controller Interfaces Line Printers To Digital Equipment's PDP-11 Mini

ORANGE, Calif. — Line printers from "almost any" manufacturer can be interfaced to PDP-11 minicomputers utilizing a controller designed by MDB Systems, Inc. which is software-compatible with both the DEC standard LP-11 and the DEC Special Systems Group LS-11 line printers.

Buffered or unbuffered printers, such as Centronics, Data Printer, Data Products, Pertec and Printec units, are connected to PDP-11 computers through a plug-in printed-circuit board.

Prices start at \$450, including cables. MDB Systems, Inc., is at 981 N. Main St., 92667.

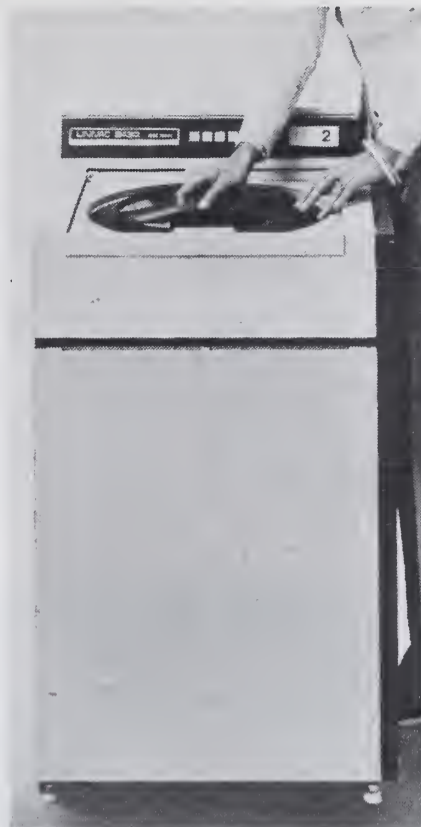
Univac 90s Get 3330-Type Drive

PHILADELPHIA — Univac has added a 3330-type disk drive, supplied by its Information Storage Systems subsidiary acquired last year, to the 90/60 and 90/70 computer systems. The 8430 has the same number of cylinders, 404, the same data transfer rate, 806 kbytes, same storage capacity 200M bytes and the same rotational speed, 3,600 rev/min, as the IBM 3330. Average access time is slightly faster at 27 msec, however.

The 8430 uses any 11-high IBM 3336-type equivalent disk pack, and error-detection codes are used to detect and correct errors to increase reliability, according to Univac. The media is compatible.

A programmed servo offset provides the ability to recover data during search and read operations by moving the arm positioner a small amount from its normal position.

The minimum 8430, consisting of a control unit and two 8430 spindles, costs \$107,520. Monthly charges, including maintenance, on a one-year rental will be \$2,800 with deliveries scheduled for this fall.



8430 Disk Drive

How's Your Power?

FT. LAUDERDALE, Fla. — Users wondering just how bad their power line variations really are can rent the Data Research Corp. Powerguard monitor at any one of the General Electric Instrument Rental Program facilities.

Powerguard will warn the user of line voltage variations down to 1 msec duration.

It is a complete monitoring system including strip/chart recorder transient detection electronics, audible and visual alarms and digital clock to indicate precise moment of power malfunction.

Pluggable into any wall outlet, the unit rents at \$150/mo from GE on a month-to-month basis, \$76.85/mo from Data Research on a two-year lease, and can be purchased for \$1,485 from the company at 2601 E. Oakland Park Blvd., 33306.

Cal Data Memory DEC-Compatible

SANTA ANA, Calif. — California Data Processors (Cal Data) is now shipping 8K and 16K memories which are compatible with the entire line of DEC's PDP-11 computers. When used with or in place of DEC-supplied memories in models 11/15 and 11/20, they allow either 8K, 16K, 24K or 32K of Cal Data memory to be added in the computer cabinet within the space equivalent to one DEC system unit, according to the company.

Expansion to 128K Words

Cal Data opens memory expansion to 128K words in the 11/35, 11/40 and 11/45 by installation of an optional memory management unit. The firm will also provide expanded memory addressing for 11/05, 11/10, 11/15 and 11/20 models to meet custom requirements.

The 8K and 16K memories also offer an

option providing for operation of up to 31K of memory in systems without either a DEC or Cal Data memory management unit. In these configurations, Cal Data reserves 1K addresses for non-memory I/O devices instead of the 4K addresses reserved in the standard configurations.

Full cycle and access time is 675 nsec and 275 nsec for the 8K memory and 850 nsec and 300 nsec for the 16K memory. Interleaved operation may be effected with pairs of 8K or 16K units.

The 8K unit is priced at \$2,250; the 16K unit is \$3,250. Delivery is seven days for single 8K units and 30 days for single 16K units.

The company, recently acquired by Data 100, now offers users the support of Data 100's service engineers. Cal Data is located at 2019 S. Ritchey St., 92705.

165 Users Polled

Most S/3 Sites Cost \$69/Hour

By Vic Farmer
Of the CW Staff

CAMBRIDGE, Mass. — Do System/3 users know how to use their machines effectively? That was the main question an MIT student sought to answer recently when he surveyed 165 S/3 users.

Of the 165 users, Mitchell A. Ring found the median user logs 135 meter hours a month with most centers operating just one shift — 104 out of 165. Fifteen users, however, did operate three shifts.

Equipment rentals ranged from just under \$1,000/mo to just over \$7,500/mo with the median rental at \$2,425.

Applying the average rental cost to meter operation hours revealed that most users are paying about \$19.75 per meter hour of operation, which when multiplied three-and-a-half times, to allow for overhead and personnel costs, shows the typical S/3 user is paying about \$69/hr for his center.

Over half of the users reported their average I/O rate (cards read plus lines printed) per hour was under 50, with the median I/O rate at 43.

The survey also pointed out that the median system cost to process 1,000 cards or printed lines is \$7.74. Here again this figure is multiplied by 3.5 to allow for overhead and personnel and gives a total cost of \$27 for 1,000 I/O input or output lines. About 10% of the users, however, paid from \$16 to \$28 in machine costs to output 1,000 lines or input 1,000 cards.

Boxing With Output?

FRANKLIN PARK, Ill. — Desk-top file boxes suitable for storing almost any type of micrographic and data processing records are available from Bankers Box/Records Storage Systems.

The Data-Pak 612 can be ordered for filing microfilm, microfiche, 80- and 96-column punched cards or printouts and costs \$4.10 each. The Data-Pak 608 stores unburst printouts and costs \$4.40 each. The company is at 2607 N. 25th Ave., 60131.

Tape Seal Now One Piece

LIVONIA, Mich. — Are your tape seals getting old and falling apart when you need them the most? Engineered Data Products has improved its old tape seal, making it of one piece construction requiring no separate latch or hook components. The seals are priced at \$1.50 each with quantity discounts. The company is at 37200 Amrhein Road, 48150.

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Computer users and Original Equipment Manufacturers agree. Our 8010 Interpreting Data Recorder is the finest 80 column data entry unit available anywhere.

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Independent Disks Boost Throughput 44%, Cut Costs

WESTWOOD, Calif. — A medical research computer service has improved its throughput by 44% and slashed its data storage 15% by using an independent-supplied disks.

Health Science Computing Facility (HSCF), functioning with the department of biomathematics at UCLA, installed the Memorex 3660 disks two years ago as a replacement for IBM 2314s on-line to HSCF's 360/91.

According to Doug Thigpen, manager of operations at HSCF, "We experienced, while running with identical programs, an average access time reduction from 68 msec with our former 2314 disks to 38 msec with the 3660 disks, a saving of 44%."

On top of this improvement in throughput, the facility has realized a 15% rental saving.

The medical research disk data base consists of more than 1.5G bytes of information. The facility, funded with NIH (National Institute of Health) grants channeled through UCLA, has two basic objectives: serving research project investigations for more than 700 users and developing computerized techniques which enhance the nation's medical capabilities.

One of the facility's practical and ongoing contributions to medical health is its organ transplant and blood transfusion activity performed in conjunction with the laboratories at the UCLA Medical Center's department of surgery.

Blood samples from potential organ donors and recipients are received worldwide from over 120 transplant and transfusion centers. Once analyzed and typed at the laboratory, resulting data is keypunched, read into a Data 100 terminal and transmitted over voice-grade phone lines several blocks away

to HSCF. There test data is disk-filed for computer compatibility matching of individual donor and recipient blood characteristics to obtain the best prognosis of success.

Two remote users, the Bethesda Cancer Institute in Maryland and the Veterans Hospital in Nashville, Tenn., utilize on-line bidirectional transmission of test data because of the critical time value combined with their volume of compatibility requests.

Bethesda's program, originated and supervised by Dr. Robert Graw, relies on HSCF's compatibility data base to prolong lives

of leukemia victims. The disease, fatal without blood replenishment, is usually associated with children.

Whenever blood is required by a Bethesda patient, a request, initiated from a communications terminal there, results in a return message identifying potential donors.

Communications control is in a Memorex 1270 communications control unit interfaced to the 360/91.

The Veterans Administration Hospital program, under the direction of Dr. Keith Johnston, specializes in kidney transplanta-

tion.

From the disk-filed data base of recipients match-up data including doctors' phone numbers is retrieved, compared and returned. The recipient's doctor exercises the final decision on proceeding with the transplant.

"Over 18,000 individual typings are contained in our active disk file — another 64,000 inactive typings are tape-filed," stated M.G. Langston, data processing manager at one of the labs. "Disk files are updated daily to give using centers the maximum opportunity of obtaining matches as they are needed.

Based upon its success with its current 27 Memorex 3660 disk drives, HSCF recently installed four 3670 Memorex drives. The 3670 is a double-spindle module with a total capacity of 200M bytes of data storage.

With a rated average access time of 27 msec, the drives offer a potential of further improving throughput 20%. While rentals per module will only increase 1.5 times as a result of upgrading from the 3660 to the 3670 drives, rated capacity per module will increase by a factor of over six (29.17M bytes to 200M bytes).



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How to Pick Up 2.5M Words

HAYWARD, Calif. — Users of Computer Automation's Alpha-16 minicomputers can add 2.5M words of storage using the Digimetrix 1101A cartridge disk drive and controller.

The system features a fixed and removable 5440 or 2315 disk cartridge. Average access time for the drive is 35 msec and data can be transferred at 1.56 Mbit/sec.

The controller provides the word buffering and signal timing for core/disk transmission, using the block I/O and auto I/O data transfer modes of the computer and does not require DMA.

The system is also compatible with the LSI-1, LSI-2 models and 216/116 mainframes.

Priced at \$7,500, the unit includes disk drive, controller and operating software. Delivery is two to four weeks. Complete specifications and applications assistance are available from the manufacturer.

Digimetrix is at 20698 Corsair Blvd., 94545.

Graphics Available for SPC-16 Minis

SUNNYVALE, Calif. Computer graphics are now available to systems designers using General Automation SPC-16 minicomputer models 30, 50 and 70 by means of the Data Disc 6600 Television Display System.

The 6600 system is a disk-refreshed display system that uses standard television-type monitors. As many as 16 high-resolution displays may be driven by independent video channels. Color TV monitors may be used for color displays showing seven colors plus black.

Video channels may be combined for form overlay or protected data displays. Gray scale

capability is available at four or 16 levels which, when used on color monitors, can provide up to 4,095 colors.

Quarter Million Points

Graphs and charts are made up of over a quarter million individually addressable display points and up to 3,200 alphanumeric characters may be displayed on the screen at one time. Character entry rate is 30 page/sec.

A 16-terminal system, complete with video generator, disk refresh, 14-in. TV monitors, keyboards and interfaces, costs

about \$5,800 per terminal.

Data Disc is at 686 W. Maude Ave., 94086.

Printer, Floppy Disk Enhance Datapoint 2200s

BEVERLY HILLS, Calif. — The MGA Model 975 combines a 30 char./sec Diablo printer and a floppy disk storage system to interface with the Datapoint 2200. It expands the output of the Datapoint 2200 and lets the user enter, edit, retrieve, store data and obtain both hard and soft copies of text, digital data and graphic images.

The printer allows the operator to print out an exact duplicate of the data appearing on the screen — whenever it is desired.

The system has two independently operating disks of 130K characters each.

When combined with the Datapoint, the floppy disk system offers capabilities such as: automatic instant find of any predetermined location on the disk for not only data, but programs as well; faster sorting of data; automatic merging or modification of data; storage and computations of all transaction data (sales person, tax, unit price, inventory, etc.); automatic format logging; faster throughput of data entry and many others. It permits disk-to-disk duplicating for communications security in less than five minutes.

The 975 system includes diablo printer, floppy disk, power supplies, controllers and cabinet — and costs \$8,950.

MGA Computer Corp. is at 9952 Santa Monica Blvd., 90212.

Rack Your Punched Cards

LOS ANGELES — Users with lots of little packs of punched cards can get multipocket racks with any number of pockets to hold the cards, from Beemak Plastics at 7424 Santa Monica Blvd., 90046. An 18-pocket rack, for example, costs \$15.30.



In recent years, computer media buyers have been besieged by companies offering media products compatible to and "as good as" IBM.

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The Datapoint 1100 intelligent terminal



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First, compare the 1100's basic operating features with competitive systems and you will know why it's the Performance Winner. Available with 4K or 8K of random access 1600 nanosecond memory, the 1100 offers a 12x80 video display, a full ASCII keyboard for direct data entry, dual tape cassette units and a fully programmable internal computer. The 1100 comes with a complete Cassette Tape Operating System and other proven operating software, including DATAFORM II, a unique data entry language, and emulator packages for communicating with all major main frame computers. And when it comes to price, the 1100 wins hands down at \$138 per month on a 36 month lease.

Next, consider your expansion needs. Should your work requirements ever surpass

Performance Winner

the 1100's limits, you can painlessly upgrade your field offices to the widely used Datapoint 2200 Terminal Processor, and beyond that to the Datapoint 5500 Remote Processor. To upgrade to either of these units, no software revision or systems reworking is necessary. All you need do is pull the plug on the 1100, put it in for another. No other computer manufacturer can now offer such a family of upward compatible dispersed processors.

If you are currently initiating, or want to upgrade, your company's dispersed data processing capability, why settle for anything less than the Winner. For more information on the Datapoint 1100 and on the 2200 and 5500 systems, write or call the sales office nearest you or contact Datapoint Corporation, Attn: Marketing Department, 9725 Datapoint Drive, San Antonio, Texas 78284 (512) 696-4520.



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Pundits Ponder Programming Productivity Problems

Seminar Studies Test Techniques

By Don Leavitt
Of the CW Staff

BERKELEY, Calif. — Testing is the process of collecting and interpreting evidence relating to the reliability of software, according to Dr. R. Sterling Eanes, but, he admitted, no well-developed justification exists for interpreting test results in any particular way.

Speaking at a programmer productivity seminar sponsored by Softech, Inc., the firm's senior systems engineer stated that testing can, at best, guarantee that certain kinds of failures are not present.

Kinds of Errors

Three major categories of errors exist, dealing with design, construction and performance of the programs being tested.

Design errors are caused by failure to understand the problem fully, to understand the full implications of the proposed method of solving the problem, or to translate an adequate understanding of the problem into a specification for the module.

The first design error can be found only by random tests of the system, especially in areas where the problem analysis is most complex or considered weakest. If the second type of error is not detected

early in development, the system may well meet its specifications but still not work correctly, Eanes noted.

To reflect a designer's intent accurately, a specification must be at least complete, precise, unambiguous and self-consistent. To be complete, it must state what effects the program will have on its environment, what relationships must be preserved and what can be assumed in implementing the module.

Construction errors are flaws that prevent a specification from being satisfied. These errors occur in three principal ways: missing paths, inappropriate path selection and inappropriate action under a given condition.

Performance tests show how a system uses available resources. Generally, analysis of where a system spends most of its time can be used to cut the time used by at least 25%, Eanes told the seminar.

Two Approaches

Even at the "unit test" level, two fundamentally different approaches are used, Eanes recounted. Tests may be based on no certain knowledge of the internal structure of the module (the "black box" approach) or on complete knowledge of what the coding does.

After unit testing shows that the module runs "correctly" in terms of its specification, integration testing exercises the program in its working environment. If the original specs are correct, no errors

should be uncovered at this stage of testing, the engineer pointed out.

Regression testing, on the other hand, concerns the impact of the new module on those previously in the system. Tests in this case do not necessarily exercise the newly added module at all.

Eanes also asked his audience to consider the differences between top-down and bottom-up program development and subsequent testing. "Bottom-up" is the conventional approach, linking detailed modules together until the system is done. This type of testing usually requires building a "scaffolding" and errors in that can impact the tests on the actual application module being tested.

With "top-down" programming, the environment for testing each new module has already been designed and tested. The modules subsidiary to the one being tested can be "simulated" with a "stub" that at least gets the system back to the module being tested.

"Stubs" are easier to build and to check out than "scaffolding," Eanes added.

He said automated tools — test data generators, monitors, trace routines — can help programmers, but admitted Dijkstra was right: "Testing can demonstrate the presence of bugs, but never their absence."

Next week Eanes' evaluation of techniques other than testing for promoting software reliability will be covered.

NSF Conference Hears Dijkstra

By James R. Donaldson
Special to Computerworld

ALBUQUERQUE, N.M. — "For a large number [of people], thinking is a repulsive activity," Dr. Edsger W. Dijkstra said recently, acknowledging that his methods of programming are difficult to learn and practice.

Guest lecturer at a National Science Foundation (NSF)-sponsored conference on Programming Methodology at the University of New Mexico, the 1972 Turing Award winner was clearly frustrated at watching an emerging science attempt to grapple with ever-increasing machine sizes and speeds, rising expectations of both users and computer professionals, and the enigmatic process known as programming.

Only a "small percentage" of today's programmers could adopt his approach, he felt.

Organized by Professor Stoughton Bell, director of the computing center at the university, the conference included much discussion about "program correctness proving" in which a program's correct operation is validated with mathematical theorem-proving techniques rather than with traditional hit-or-miss debugging.

In his lectures, Dijkstra explained his approach to programming which is based on a set of axioms describing relationships between a program's final result, the process performed by the program, and the weakest precondition for the program to produce the desired final result. The problem to be solved is first expressed in terms of equations based on these axioms.

Then, program code is developed to implement the equations. As each program statement emerges, it is compared with the equations to ensure the equations' integrity has been successfully carried into the code. In this way, a program is built up whose correctness is assured.

This method contrasts with other approaches that seek to prove a program's correctness by developing expressions from the program statements and prove with the expressions that the program does the right thing. Dijkstra implied that the latter method may require an impractically large amount of manual work.

His method, he believes, produces a simpler, more elegant program by requiring that an elegant proof be developed before the program is written. Furthermore, he said, "The concept of weakest precondition will be used as the cornerstone for defining computer languages amenable to correctness proofs."

For his programming examples during the conference, Dijkstra used his own variant of Algol 68 which is specially suited to representing proof equations. He suggested he may have a textbook out on his method in about two years.

'QL/I' Links to DL/I

Independent's Package Backs IMS Queries

NEW YORK — IMS/360-controlled data bases can be accessed by non-programmers, without using Cobol, Assembler or PL/I, through the facilities of Query Language/One (QL/I) now available from Programming Methods (PMI). Though it works with the Data Language/One (DL/I) portion of IMS, QL/I uses an English language command format.

The end user need not have any detailed knowledge of the data base structure, PMI spokesmen noted. QL/I operates in either query or report mode, allowing quickly phrased logic and casually formatted output, or more structured re-

ports that can be produced on a periodic basis.

Classic Support

Data base maintenance can be handled in query mode. In report mode, the package provides the classic support: pagination, dating, three levels of heading, margin and tab settings and the like.

Full relational and logical operators in comparison statements are available. So are "full arithmetic capabilities," the company said, adding that functions may be defined in the QL/I metalanguage to ease their future use.

The metalanguage supports three verbs (Define, Delete, Display) and parameters to shape the functions, PMI said.

QL/I also supports stored routines so that complex queries, involving a number of logical steps, may be invoked by a single statement that names the desired routine. Query mode users who do not need immediate answers may use another QL/I under which responses may be deferred to batch processing.

The system now includes field and terminal-level data base security. The current QL/I includes support for IBM 3270 CRT units as well as older terminals.

QL/I may operate as a stand-alone query system for batch use or as an

on-line system under the communications support of IBM's IMS or PMI's own Intercomm teleprocessing monitor. Linkage to data bases other than IMS-DL/I are in development, PMI added.

QL/I is available for a one-time fee of \$20,000 or a 48-month plan costing \$500/mo. Installation and a year's maintenance are included, but major enhancements and maintenance after the first year are separately priced.

PMI, a division of GTE Information Systems, Inc., is at 1301 Avenue of the Americas, 10019.

CICS Seminar Planned For Later This Week

NEW YORK — Senior technical and management staffs can gain insight into IBM's CICS data communications support package at a one-day seminar sponsored by Computer Horizons Corp., to be held at the New York Hilton Feb. 7.

The session will cover the current status of CICS under both DOS and OS/VS environments, problems in using the system and debugging aids that are available. Other teleprocessing monitors will be compared to CICS at this \$35 meeting, a spokesman noted from 747 Third Ave., 10017.

CDP Review Scheduled For Washington Area

WASHINGTON, D.C. — Candidates for the Certificate in Data Processing (CDP) examination can get help in their preparation at the fifth annual CDP Review offered by Compudemics, Inc. here, Feb. 11-13.

All five sections of the examination will be reviewed, the company noted, and the CDP Review Manual, published by Auerbach, will serve as text for the course. Tuition is \$275. Compudemics is at Suite 500, 1629 K St., 20006.

100 REASONS FOR USING THE VALU-LIB SYSTEM

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COBOL CLINIC COUNTERPOINTS

Despite 'Standardization'... ...Techniques, Compilers Still Vary

● Use Alters 'Sync' Savings

Items (1) and (2) are a direct response to two points brought up in the Seidel "Clinic" article [CW, Nov. 21]. The other items are concerned with additional suggestions for Cobol efficiency and optimization.

(1) Using PIC "X" for a switch instead of PIC 9 is great — but why stop there? This is also true for any field that is not used as a subscript or in an arithmetic operation. In other words, whenever possible, use alphanumeric type compares instead of numeric for display data.

(2) Specifying SYNC for COMP (binary) items is not only necessary in version 4 ANS Cobol. At our installation, we are still using version 2 and SYNC is necessary for efficient generation. We had programs decrease by as much as 10K by adding SYNC. It depends on how much the COMP fields are used.

(3) COMP-3 (packed) items should be specified by an odd number of digits. Specifying an even number of digits causes instructions to be generated to zero the high-order digit of the packed field, whenever it is the receiving field.

(4) Move numeric display items that will be used in more than one arithmetic or "IF" statement to a COMP-3 Working Storage field to avoid multiple conversions.

(5) Optimization. We have been using a Cobol object code optimizer from Capex Corp. for quite some time. The package is very easy to use and the support from Capex is very good. The package reduces the core requirement considerably (in our case close to 30% of Procedure Division) and also saves on CPU time (we have no accurate measure of this).

Our experience has been that a compile with optimization adds about 50% to the time it takes to do a compile only. So it does cost to do an optimization, but the resultant savings can be very significant. The use of the optimizer must be on a selective basis after careful evaluation.

For example, it might be unwise to optimize a very small program which uses very little CPU time or a volatile program which requires frequent compilation because of the extra time required for optimization — Name withheld by request.

With the ever-growing use of Cobol as "the" language for business applications, Computerworld started the Cobol Clinic as a clearinghouse of user experience, inviting articles and shorter responses to get the most out of programming techniques that have been accumulated. These letters are some of the responses to date.

● 370 Won't Overlap Fields...

Burket's article [CW, Dec. 19] was an interesting, well-presented and valuable aid to efficient Cobol usage, particularly in an environment where storage efficiency is important. The most important point, however, is one which requires constant reemphasis, particularly in light of the fact that one of her key recommendations must be used with care. The key point is that the compiler user *must be aware of how the compiler handles various types of functions before he/she can use it most efficiently.*

The propagating move technique is a highly effective and efficient method for initializing a table. It works effectively with most of the IBM Cobol compilers and I have often made use of it. There are, however, some notable exceptions. The ANS Version 3 (DOS) and Version 4 (OS) optimizing compilers, when, "OBJECT-COMPUTER. IBM-370," is specified, generate 370 instructions.

When the length in the move is greater than 256 bytes, an MVCL instruction is usually generated. This instruction performs a *non-destructive* move in that, when the sending and receiving fields overlap, the move is performed only up to the point of overlap. The move is then terminated and condition code 3 is set. The compiler-generated code does not check for this and no warning diagnostics

are issued. Use of a propagating move, under these conditions, results in only the first entry being properly initialized. The rest of the table is not initialized and the first indication of this is usually a programabend (DATA EXCEPTION) or incorrect results.

This is but one instance where "fancy programming" can result in future problems. There is a rather obscure notation in the ANS Cobol (language) manual which states that where sending and receiving fields overlap, the results are "unpredictable."

One must remember that, even though the results of an "unpredictable" operation will be consistent (i.e., if the move worked once in the program, it will work again) within the same compiler and release, there is no assurance this will hold true in the future and, more importantly, the responsibility lies with the compiler user, not with the vendor, for diagnosing and correcting future problems.

There are enough techniques for writing accurate, efficient programs available so that one may safely sacrifice the more marginal techniques in order to preserve and protect the honesty and integrity of the program from future "enhancements" by the vendor — Justin E. Schulman, consultant.

● When is Initialization Done?

I disagree with the statement "Computational-3 or mixed-format matrices cannot have initial values assigned to them at compilation time." If I wanted to assign an initial value to the matrix, I would code the following:

```
01 INITIALIZE PIC 9(2400)
  COMPUTATIONAL-3 VA ZERO.
01 MATRIX REDEFINES INITIALIZE
  COMPUTATIONAL-3.
  03 MEMBER OCCURS 150 TIMES.
    05 SUB-A PIC S9(7)V99.
    05 SUB-B PIC S9(5).
```

Note that initially the table would be all

zeroes. If a subsequent clearing is required, I would code:

```
MOVE ZERO TO INITIALIZE.
```

I tested both this method and Burket's method on our Burroughs 2502 using CP40. I found that although her coding saved nine bytes in the Procedure Division, it wasted eight bytes in the Working-Storage section. The question thus comes down to whether one wants to reinitialize the table or just initialize it at compile time — Jerrold Dykstra, technical programmer.

● 'Tricks' Cause Headaches

I have found, more than anything else, that machine-dependent "tricks-of-the-trade" are the undoing of many an experienced programmer. Cobol was designed to be machine-independent.

Different manufacturers have slight variations in their Cobol compilers that can cause havoc if you try to convert to a different make, or even upgrade. For instance, NCR Century Cobol will support the following Cobol statement:

```
SET index-name TO ZERO. (or 0)
```

Presumably, when identifier (index-name) is accessed, the ZERO-th element of the table will be addressed, which would be, under Cobol, out of the range of the table. Therefore, IBM ANS Cobol does not allow the above SET statement to be syntactically correct. The problem comes in when you receive an NCR Cobol program to implement in your IBM shop. Conversion time, again.

Another practice commonly used on smaller equipment is to utilize a file buffer before opening or after closing the associated FD name, or after end-of-file has been signalled. This will work as long as the buffers are allocated at load time, and remain addressable for the duration of the execution. As soon as you move into a dynamic buffer allocation environment (as in O/S MVT), the buffer is not allocated until the file is OPENed, and if input, READ.

In addition, the buffer is freed on end-of-file or CLOSE. Again, you are into

that conversion effort that could have been bypassed if good solid programming were done. If the buffer is needed before OPEN, READ, or after end-of-file or CLOSE, allocate storage explicitly for the work-area within the WORKING-STORAGE SECTION.

This is not to say some tricks cannot be utilized. On the contrary, they may save enough time on the slower CPUs that the conversion is worthwhile (if necessary). And some "tricks" can be played within the confines of Cobol guidelines. The usage clause COMPUTATIONAL is defined as binary for most compilers, and LOW-VALUE is defined as all bits zero. Therefore, moving LOW-VALUES to a COMPUTATIONAL array will effectively zero out the table, and should work on most compilers.

Perhaps the problems mentioned above are due to non-explicit Cobol guidelines, or to the software writers going too far with "extensions." I am convinced that if you code only as is explicitly allowed in the manual for your compiler, and avoid those neat tricks gleaned from extensive knowledge of the object-code and the object-machine, you will avoid also the most major problems when you change machines. No one likes conversions and their associated headaches. By coding "by the book" you will be more satisfied when that upgrade finally does come along — Kenneth A. Patrick, management analyst/programmer.

Program Usually Dies, and...

... This MVCL instruction, for reasons known only to God and the 370 designers, checks for an operand overlap and aborts if there is one. The resulting condi-

tion code is not checked by any compiler generated code, and the program usually expires shortly thereafter — P.E. Brownswords, programming supervisor.

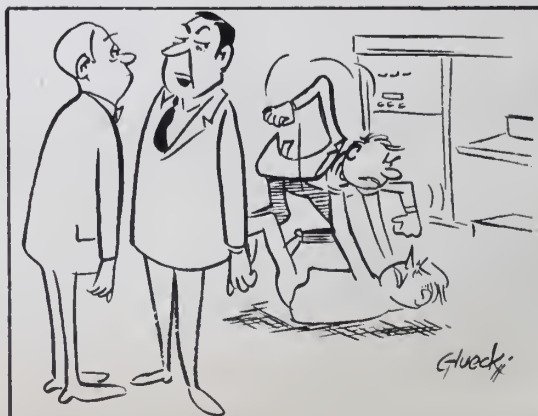
'Unnecessary' Debugging Is Needed

... The effect, therefore, on program execution is simply that the matrix does not get initialized and that the program will probably cancel when the matrix is used later on, or cause unpredictable execution or erroneous output.

The worst effect, however, is that some Cobol programmers may have to spend a great deal of time debugging this problem unnecessarily if they are not aware of the methods used by the compiler to generate

object-code and the characteristics of the instructions generated.

I must admit that Burket's propagation technique could be considered valid for use in ANS or Cobol-D programs written for use on non-370 computers or compiled for 360 and run on 370, but I think it would be wise to consider the future use of those programs before coding in a technique which could affect the upward compatibility of those programs — Elwin J. Howland, systems programmer.



Oh them? They're just debugging a ANS Cobol program that was developed on a different machine.

Data Standards Work Affected by IBM's SDLC

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. — A proposed data communications protocol standard submitted to the American National Standards Institute (Ansi) by IBM may contain differences from other proposals now under consideration as part of an international standards effort.

IBM has proposed a standard for its Synchronous Data Link Control (SDLC) protocol despite the fact that a special committee of ANSI, designated X3.S3, has been working for some time on a similar bit-oriented protocol known as Advanced Data Communications Control Procedure (ADCCP).

To further complicate the issue, a worldwide effort has been under way for some time to arrive at a standard high-level bit-oriented communications protocol in anticipation of international data communications networks.

It now appears that several non-U.S. standards have been proposed that are close to the U.S. ADCCP protocol. Last December the general assembly of the European Computer Manufacturers Association (Ecma) adopted the Ecma-40 standard for a High Level Data Link Control (HDLC). The Ecma-40 standard appears to closely resemble a similar stan-

dard from the International Standards Organization, called DIS 3309.

Based on preliminary evaluations, one standards expert said the Ecma/ISO standard "exactly fits" the ADCCP proposal.

But the Ecma/ISO standard does contain some

A Standard Approach

differences from the IBM SDLC proposal which may be in the frame check structure, the expert said. It is now believed both the control and address fields are compatible and the differences now apparent "may not be a big problem," the expert said. "If you adhere to the frame structure standard, I think you can use either ADCCP or SDLC," he said.

But it is still too early to say whether IBM's SDLC equipment will be compatible with ADCCP and/or the Ecma/ISO standard. An IBM spokesman said it was "premature to answer" the compatibility question, "since the standard is still under consideration."

The current Ansi standards machinery has been working on ADCCP for some time. A special Task

Group 4 of Ansi is expected to vote soon on whether to adopt ADCCP. If approved by the Task Group, it would then have to be voted on by the S3 level and finally the X3 level of Ansi to become a standard. If approved at all three levels, suppliers will probably begin to provide equipment and software to meet the new standard, the expert said.

The IBM SDLC standard proposal was first introduced into the standards environment about a year ago at a meeting by a representative of IBM France. It was proposed to Ansi by IBM last December and has not yet formally been considered by Task Group 4.

A uniform bit-oriented communications standard is needed in order to implement international data transmission networks of the future. If IBM's SDLC contains significant discrepancies from other standards, it could seriously impact the growth of such networks.

At present, there is no reason to assume IBM intends to set up its own line protocol standard in order to lock users into IBM equipment. But if previous IBM policy is any indication, experts point out that IBM never fully supported Ascii. Its equipment, while compatible with Ascii, has primarily been designed for Ebcidic even though most non-IBM equipment adhered to the Ascii standards.

One State's Blue Cross Net —Part II

Asciscope 'Best' for Low-Volume Inquiry/Response

By Pat Ward
Of the CW Staff

COLUMBIA, S.C. — Although his ITT Asciscopes failed him more often than he thought they should, the terminals' performance at the price is the best he's seen for his application, observed Marion Kolb, director of telecommunications and control for Blue Cross of South Carolina.

The individual hospitals use the Asciscopes to enter a relatively

Three Wats lines are used, two full and one measured, plus two local lines for nearby hospitals.

The system provides inquiries for basic, in-state information with instantaneous response. Inquiries for Medicare or the Federal Employee Program are run through the Blue Cross Honeywell 3200 CPU and put on magnetic tape, which is then sent out over a Honeywell magnetic tape transmission (MTT) device onto the Blue Cross national net to the switching center in Chicago.

Replies come back over the MTT and that tape is pulled off in the morning, before the communications system to the hospitals is brought up.

When the users open their terminals to the central site, the system indicates how many pages of Medicare replies are pending.

The hospitals have the option of retrieving those pending replies any time during the day.

Most of the larger hospitals don't use the Asciscopes' built-in acoustic coupler but rely on a Data Access Arrangement (DAA) instead.

Smaller hospitals that are going to have fewer calls a day don't want the expense of having a special phone put in with automatic dialer to use the couplers.

Kolb said.

Most of the larger hospitals attach NCR 260, 30 char./sec thermal printers to their Asciscopes. Blue Cross recommends this for hospitals that have a high volume of inquiries and want hard copy printouts.

Another hospital with lesser volume and where "the noise back there is something they can stand" might use Model 33 ROs, Kolb said.

On March 1, Blue Cross will go to an IBM 370/145 mainframe with a 3704 front end, Kolb mentioned, and soon after he hopes to start testing transmission of outpatient claims from the hospitals.

Before the move to Asciscopes,

19 hospitals had been sending inquiries over teletypewriters and the rest had been mailing them to Blue Cross.

Keying Cut 66%

The move to the new system cut keying by 66% at Blue Cross and speeded up billing and cash flow and reduced bad debts at the hospitals, Kolb stated.

About other terminals, Kolb remarked that Hazeltine's 1000 does cost only \$49/mo and "that's a good price, but it does not have a built-in modem and it only operates in character mode."

The Hazeltine 2000 leases for \$88/mo and would do the job, but it has features not really

needed by Blue Cross and even it doesn't have a built-in modem, Kolb declared.

Blue Cross passes along to the hospitals the cost of the equipment they use in the field.

For a large hospital, that might include the Asciscopes at \$65/mo and the NCR 260 at \$75 (both on one-year leases) and the automatic one number dialer and DAA costing \$5 between them. A private business line would bring the total with tax to about \$175/mo.

Hospitals using the Model 33 RO could cut about \$55 from this, Kolb mentioned, and the smallest hospitals wanting just the Asciscopes would be charged only for its \$65/mo lease.

User Casebook

low volume of eligibility checks for health care benefits for transmission at 300 bit/sec to Blue Cross headquarters here.

This is not an "all-day continuous inquiry type thing," Kolb stressed.

"Some hospitals, the smaller hospitals, may make only two inquiries a day through this," he said. "So for low-volume inquiry and response, I think it's an ideal system at low cost."

The line costs to serve the hospitals come to about \$1,600/mo, including five Bell 103A modems at the central site, said Kolb, who considers that an economical figure for the service provided.

Data Services Adds Cassette Buffer

MAHWAH, N.J. — Western Union Data Services has added a tape cassette buffer to its 30 char./sec EDT 300 teleprinter.

The EDT 300 MSR, the latest cassette buffer, is available with the KSR version of the teleprinter and is designed for data entry and polling applications.

The buffer operates in three modes: on-line independently of the printer; on-line with the printer; or locally off-line with

the printer. It adds a 60 char./sec and 120 char./sec transmit and receive capability to the teleprinter's basic speeds of 10-, 15- and 30 char./sec.

The cassette buffer can follow functions under remote computer or local keyboard control: write, read, rewind, backspace and skip, allowing character editing. The buffer also provides an up-to-24-character programmed answerback; all but the last character are programmable to meet

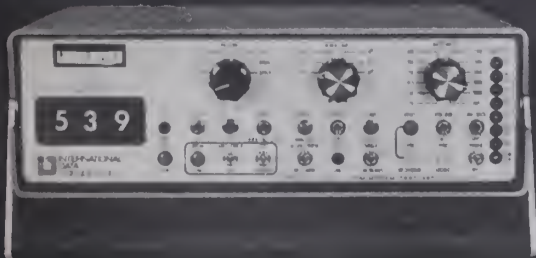
application requirements.

Backspacing capability permits editing and error correction of data on tape during any local or remote mode of operation.

The MSR is compatible with EIA RS232 connections as well as customer-supplied Bell 202C data sets or their non-Bell equivalents with reverse channel. The EIA version is \$176/mo on a one-year lease and \$196/mo for a minimum 90-day lease.

The firm is at 85 McKee Drive.

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In case you need more power, we have two Real Time Data Processing

Systems, one with time sharing capability (Dartmouth BASIC). Both systems have General Automation's SPC-16 as a front end processor; it's the most powerful minicomputer available. Both have a powerful file management package and accessibility from as many as 32 remote terminals.

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Paris, France. Phone 686-7431.

GENERAL AUTOMATION 18/30 DMS

Terminal Transmits at 19.2 KBit/Sec

NEWTON, Mass. — Codex Corp. has a communications system that allows transmission up to 19.2 kbit/sec over two voice-grade lines.

Intended especially for mainframe-to-mainframe communications, the CT-6 terminal includes

a Codex 296 bi-plexer and two of the firm's 9600C modems in a cabinet, plus necessary cabling.

The combined system provides full-duplex data transmission at speeds up to 19.2 kbit/sec by combining the capacity of two independent voice-grade chan-

nels, each operating at 9,600 bit/sec.

Use of the CT-6 over voice-grade lines costs considerably less than leasing wideband facilities to accomplish transmission over 9,600 bit/sec, a Codex spokesman stated.

The CT-6 incorporates automatic and semiautomatic fall-back and fall-forward capabilities, the spokesman noted. Audio and DC loopback capabilities are also built in, the spokesman added.

The CT-6 costs \$25,700 purchase, or leases for \$760/mo from the firm at 15 Riverdale Ave., 02195.

Monitor Transparent to Modem

MILWAUKEE, Wis. — Data Communications & Consulting, Inc. has introduced a data monitor that fits transparently between business machines and any modems using the RS 232 interface, according to the firm.

The unit has male and female 25-pin connectors and a 20 by 10 connection matrix. The matrix's horizontal rows are connected to leads two through 10 and 14 through 23 of the standard EIA-RS 232B/C connector. The vertical columns connect to seven test lights, and putting a pin in the interconnection between leads and test lights shows a "go" or "no go" state.

The unit can be inserted between modem and business machine as a monitoring unit, or it can independently generate control levels to the modem or business machine to isolate faults, a spokesman said.

In testing the modem in a full-duplex dedicated line facility, for example, a user might insert pins in the matrix for send-data, receive-data, request-to-send and clear-to-send signals. A second pin would be inserted in the request-to-send row in the +5 volts column.

The user could put another pin in the vertical column on row two (for send-data) and a stream of binary ones down the line would result. If there were a loopback arrangement at the other end, the receive data light

would come on, the spokesman explained.

The 200 Data Monitor costs \$425 including interface cable, with lease plans for quantity orders available. Delivery is 30 days from the firm at P.O. Box 3673, 53217.

Now your key-to-disk system can talk to your factory foreman.

CCITT Coupler Offered

PHOENIX — Omnitec Corp. has an acoustic coupler manufactured to CCITT standards.

The Model 704A offers originate/answer modes, simultaneous teletypewriter and RS 232 terminal interfacing, half- and full-duplex switching, optional DAA line coupling and upright/inverted frequency switching, the firm stated.

The unit costs \$385 from the firm at 2405 S. 20th St., 85034.

Device Controls TTY Motor

CAMBRIDGE, Mass. — CSM Medical Devices has a device that turns on the motor of a Model 33 teletypewriter in line mode for receiving data and turns it off again after transmission is received.

This saves wear on the motor, which would otherwise be running as long as the teletypewriter was in line mode, a CSM spokesman stated.

Called the TTC-303, the module mounts within the teletypewriter enclosure and requires no external power connection, according to the spokesman.

Independent timers, variable from one second to an hour, are provided for cutoff once a line becomes open.

The module is primarily intended for attachment to read-only (RO) devices but there is a bypass switch attached to the TTY's keyboard to permit outgoing transmission, the CSM spokesman noted.

The control module costs \$89.50 with delivery from stock from the firm at 377 Putnam Ave., 02139.

Nobody can be everywhere at once.

But now, your foremen and other plant supervisors can make a pretty good stab at it. Because MDS has just introduced a new coupler for our 4400 data collection system.

It inputs the 4400 data to our 2400 Key-Display System. The 2400, as always, provides key-to-disk data entry with tutorial display and editing-as-you-go.

Coupled with the 4400 System—now or later—the 2400 gives plant supervision eyes everywhere. They get CRT lookup to any record on the disk—as entered.

They can locate a job, logged that day, on the production floor. Check if it's on or off schedule. Check that day's scrap. Parts available. Manpower available. Or any other current record.

The factory data on disk can be dumped to tape or reformatted, too.

So the data collection system becomes more powerful. When used with the central processor, it gives management current analysis and control of the daily flow of business.

And now it also gives factory supervision a useful bird's-eye view.

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That's an awful lot for your buck. For the full story in terms of your own operation, call your nearby MDS office, or our headquarters at (315) 792-2424. Mohawk Data Sciences Corp., Utica, N.Y. 13503.



System 4400.
Lets you see where
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Mohawk Data Sciences
MS

Sherry Says...



The Data Communication Forum

Some people wonder why there's such a growing interest in modems that operate at very high speeds. Especially since the higher speed modems are usually higher priced. Still, many data communication users are going up to data rates like 4800, 7200 and 9600 bits-per-second. But, really, it's easy to understand why. For instance, one of the ICC engineers estimates that if we were to transmit just this little column, it would take more than 9,000 bits of information! So, a typical business message with lots of detail could take millions of data bits. With the pressing demand for DP services, no wonder users are anxious to transmit their data as fast as possible.

Fame at last!

ICC's new product catalog is just off the press, and it's full of modems and other data communication products with lots of great features. It's so complete that they even included my picture on the cover. Write to me for a copy... autographed if you wish. No charge. Just applaud loudly when you visit the ICC booth at the trade shows.

If you have questions or topics you would like to see in our column, send them to: "Sherry Says" c/o: International Communications Corporation 7620 N.W. 36th Avenue Miami Florida 33147
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The day Midwest airlines got their new DC-10.

What can you do . . . fire your programmer? Give your 360 a swift kick in the console? The fact remains, that EDP errors can ground even the largest operation.

What you need is a way to cut your possibility of error down to an absolute minimum. And the easiest place to start is in your selection of computer tape. How? By specifying BASF.

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Here's a New Systems Gap

NEW YORK — "Bridging the Systems Expectation Gap" is the theme of the 20th Annual Systems Management Conference sponsored by the American Management Associations.

The conference, March 11-13, at the Americana Hotel here, will include a briefing session on increasing data processing productivity through job motivations.

The first day's program features concurrent sessions on security and auditing,

project management, improving data base management design and computer networks. Metrication and systems design and systems performance evaluation will also be examined.

Tuesday's sessions will deal with systems for hospitals, state and local governments, manufacturing, retail information

Societies/ User Groups

and education. Insurance and financial and banking systems will also be discussed.

On Wednesday, a plenary session will be devoted to the expectations of top management for systems and EDP.

Registration information is available from the American Management Associations, 135 West 50th St., New York 10020.

Calendar

Feb. 13-15, Chicago — 45th Annual Personnel Conference, sponsored by the American Management Associations. Contact: AMA, 135 West 50th St., New York, 10020.

Feb. 26-28, San Francisco — Compcon 74. Contact: Jack D. Kuehler, IBM General Products Division, Monterey and Cotter Roads, San Jose, Calif. 95193.

March 6-14, Cleveland — Institute of Internal Auditors' Seminars. Contact: Kathy Fedell, 5500 Diplomat Circle, Orlando, Fla. 32810.

March 7, Washington, D.C. — Computer Law Association Meeting. Contact: Robert P. Bigelow, 28 State St., Room 2200, Boston, Mass. 02190.

March 7-9, Olympia, Wash. — First Annual International Computer Film Festival. Contact: Richard Speer, Department of Computer Services, Evergreen State College, Olympia, Wash. 98505.

March 12-14, Los Angeles — Wincon 74. Contact: G.W. Little, Northrop Corp., One Research Park, Palos Verdes Peninsula, Calif. 90274.

March 13-15, Tampa, Fla. — Seventh Annual Simulation Symposium. Contact: P.O. Box 22573, 33622.

IIA Meeting Focuses On Problem Solving

WASHINGTON, D.C. — Readily available solutions to complex information problems will be the theme of the user workshops at the 6th National Meeting of the Information Industry Association.

The meeting, March 18-21 at the Sheraton Park Hotel here, will also feature management forums and an information resources exposition.

One of the workshops will deal with on-line information services and the control of data bases, while a management forum will look at electronic access to data banks.

Further information is available from Robert A. Vitro, IIA/Washington, 4720 Montgomery Lane, Bethesda, Md. 20014.

(Advertisement)

Learn What You Need to Know About Contracting for Computers and EDP Support Services-In One Hard Lesson

A two-and-a-half-day seminar that can help you protect your EDP investment — and your system.

The response to our first ad on this seminar was excellent, and we've decided to go ahead with three seminars in the first part of 1974. Conducted by Roy N. Freed, the well-known expert in computer-related law, this unique seminar can give you the information you need to get good, effective contracts from the vendors that supply your EDP installation. And in an industry that's famous for its "promise them anything" attitude, this information can be invaluable. It can save you money. It can save you time. And, most important of all, it can help you protect your installation from disruptive discontinuities.

Here are some of the subjects covered in the seminar:

- The lease or purchase of computer systems.
- The lease or purchase of separate hardware or software.
- The purchase of time-sharing, data processing services and consultation.
- The use of facilities management.

And here are some of the things you'll learn:

- How to recognize opportunities to negotiate.
- How to establish goals and state conditions — before it's too late.
- How to place yourself in a strong bargaining position.
- How to insure on-time delivery of exactly what you've bargained for.

- How to reach an agreement that protects the security of confidential data.

- How to set reasonable performance standards for warranties.
- How to provide tax savings through proper wording of contracts.

Free Resource Notebook

You'll also receive a valuable reference notebook which will back up the information you'll receive at this meeting. The notebook will include sample vendor contract forms.

Roy N. Freed, a leader in this field.

Roy Freed has specialized in computer-related legal matters for many years. He has served as inside counsel for a major manufacturer of digital computers, and is currently engaged in private practice with the Boston firm of Peabody, Brown, Rowley & Storey. He has authored many articles on the various legal aspects of computers — including "Computer Frauds — A Management Trap" (*Business Horizons*) and a book entitled "Computers and Law — A Reference Work." Mr. Freed will personally conduct the entire seminar.

Should you attend this seminar?

If you're involved in the purchase of EDP equipment or services, the answer is a resounding "yes." Whether you're a corporate counsel, contract administrator, DP manager, consultant or officer of a using firm, this seminar will pay for itself many times over. You just have to read the pages of *Computerworld* to realize how frequent supplier problems are — and how

costly and disruptive they can be. This seminar can help you get what you want when you want it. It will help your company, your industry and you!

Times, places and cost

There are still two more seminars scheduled this spring.

Mar. 13 - 15 Regency Chicago
Hyatt O'Hare

May 22 - 24 St. Francis San Francisco

Total cost for the entire seminar, including the complete resource notebook, continental breakfasts, lunches and coffee breaks, is \$295.00. Hotel rooms, if required, are not included.

Note: Enrollment must be strictly limited, and our New York seminar was sold out. So don't wait until it's too late to enroll.

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Listing of General Interest DP Societies Compiled

Computerworld has compiled an up-to-date listing of representative general-interest DP societies.

Trade groups of vendors, and groups requiring use of certain manufacturers' equipment, are excluded.

Executive directors and phone numbers have been added to this year's listing, where available.

American Institute of Aeronautics and Astronautics (AIAA), 1290 Sixth Ave., New York, N.Y. 10019. James Hartford. (212) 581-4300.

American Institute of Certified Public Accountants (Aicpa), 666 Fifth Ave., New York, N.Y. 10019. Wallace E. Olsen. (212) 581-8440.

American Society for Information Science (Asis), 1140 Connecticut Ave.,

and Analysts (Acpa), P.O. Box 95, Kensington, Md. 20795. James Manley. (301) 949-8347.

Biomedical Computing Society (BCS), 5333 Westbard Ave., Bethesda, Md. 20014. Ralph Stacy. (618) 453-2583.

Communications Systems Management Association (CSMA), West 1102 St., Suite 1001, Wilmington, Del.

Computer Lawyers Group (CLG), 28 State St., Suite 2200, Boston, Mass. 02019. Robert Bigelow. (617) 742-8300.

Data Processing Management Association (DPMA), 505 Busse Hwy., Park Ridge, Ill. 60068. Donn Sanford. (312) 825-8125.

Geoscience Information Society (GIS), c/o The American Geological Institute, 2201 M St. N.W., Washington, D.C. 20036. (202) 296-7950.

Graphic Communications Computer Association (GCCA), 1730 North Lynn St., Arlington, Va. 22209. Norman W. Scharpf. (703) 527-6000.

Institute for Certification of Computer Professionals (ICCP), P.O. Box 1442, Chi-

cago, Ill. 60690. (312) 427-6776.

Institute of Electrical and Electronics Engineers, Inc. (IEEE), 345 East 47th St., New York, N.Y. 10017. Harry Hayman. (212) 752-6800.

Instrument Society of America (ISA), 400 Stanwix St., Pittsburgh, Pa. 15222. Herbert Kindler. (412) 281-3171.

International Communication Association (ICA), P.O. Box 445, Flint, Mich. 48501. B. Martin Hurley. (313) 766-2154.

International Tape Association (ITA), P.O. Box 11070, Tucson International Airport, Ariz. 85734. Larry Finley. (602) 889-6338.

Larc Association (formerly Library Automation Research and Consulting Services), Box 27235, Tempe, Ariz. 85282. Frank Patrinostro. (602) 968-2023.

Numerical Control Society, Inc. (NCS), P.O. Box 138, Springlake, N.J. 07762. William White. (201) 499-1400.

Simulation Councils, Inc. (SCI), Box 2228, La Jolla, Calif. 92037. Alex Mc-

Kenna. (714) 459-3888.

Society for Industrial and Applied Mathematics (SIAM), 33 S. 17th St., Philadelphia, Pa. 19103. Robert Windsor. (215) 564-2929.

Society for Information Display (SID), 654 Sepulveda Blvd., Los Angeles, Calif. (213) 472-3550.

Society for Management Information Systems (Smis), 18 S. Michigan Ave., Chicago, Ill. 60603. (312) 346-1862.

Society of Certified Data Processors (SCDP), 38 Main St., Hudson, Mass. 01749.

Society of Data Educators (SDE), 247 Edythe St., Livermore, Calif. 94550. Arthur M. Pike. (505) 894-6732.

Society of Professional Data Processors (SPDP), Green Lake Farm, Fayetteville, N.Y. 13066.

Special Libraries Association (SLA), 235 Park Ave., New York, N.Y. 10003. Frank McKenna. (212) 777-8136.

Telecommunications Association (TCA), 6311 Ucca St., Los Angeles, Calif. 90028.

Societies/ User Groups

N.W., Suite 804, Washington, D.C. 20036. Joshua Smith. (202) 659-3644.

American Statistical Association (ASA), 806 15th St., N.W., Washington, D.C. 20005. Fred C. Leone. (202) 393-3253.

Association for Computational Linguistics (ACL), 1717 Massachusetts Ave., N.W., Washington, D.C. 20036. A. Hood Roberts. (202) 528-4312.

Association for Computing Machinery, Inc. (ACM), 1133 Avenue of the Americas, New York, N.Y. 10036. Joseph Cunningham. (212) 265-6300.

Association for Development of Computer-Based Instructional Systems (Acdis), c/o Office of Academic Affairs, Ohio State University, 1080 Carmack, Columbus, Ohio 43210. G. Ronald Christopher. (614) 422-9821.

Association for Educational Data Systems (AEDS), 1201 Sixteenth St. N.W., Washington, D.C. 20036. Shirley Eastwood. (202) 833-4100.

Association for Systems Management (ASM), 24587 Bagley Road, Cleveland, Ohio 44138. Richard Irwin. (216) 243-6900.

Association of Computer Programmers

IEEE/CS Elects Yau President

NEW YORK — Dr. Stephen S. Yau of Northwestern University has been elected President of the IEEE Computer Society.

A member of Afips Board of Directors, Yau is Conference General Chairman of the upcoming 1974 National Computer Conference and Exposition.

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The new UA-500 gives you 500 of the sharpest analysis filters with our proven 24 dB/octave slope.

You asked to measure digitally with a quickly set marker to prevent errors in reading the spectra and averages.

The new UA-500 gives you a digital reader which calculates the absolute frequency setting of a vertical cursor consisting of a line and a dot. (Digital amplitude display optional.)

You asked to hold past data for comparison of averages before and after changes in the test conditions.

The new UA-500 gives you three memories . . . two in the averager and one in the spectrum analyzer. Spectrum data obtained from any two can be compared on one CRT. Total storage is 2500 digital words.

You asked to see what's being analyzed to verify the quality of the data.

The new UA-500 gives you instantaneous spectra which can be viewed on the same CRT as average . . . input time function can also be displayed on CRT.

You asked for a small portable unit to use in the laboratory or in the field.

The new UA-500 gives you the first combined 500-line Analyzer-Averager . . . one 8 3/4" unit.

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Transient capture, exponential and peak averaging, lin-log scales both vertical and horizontal, complete plotter set-up and recording, and computer compatibility with remote sensing or control (optional).

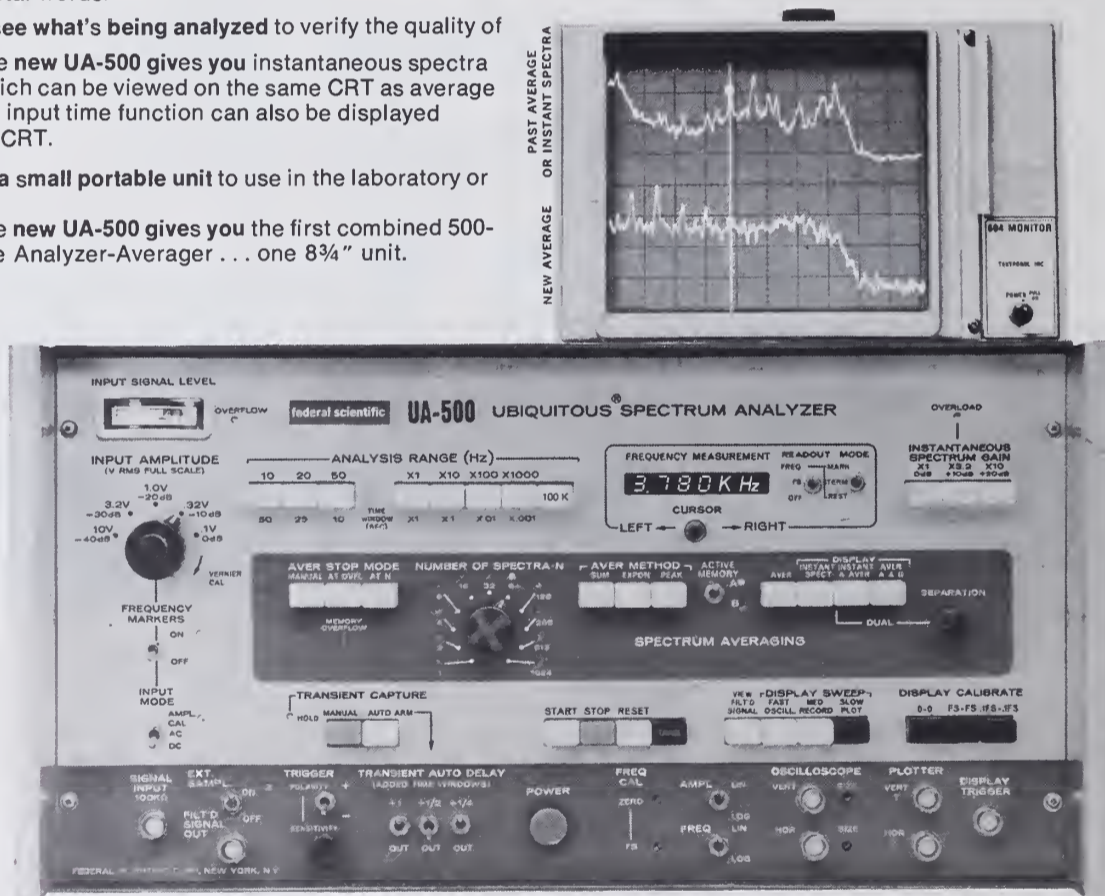
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Write for our free booklet "11 questions you should ask when buying a real-time spectrum analyzer," or call us for a demonstration at your facility.

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Don't Neglect System Controls

TORONTO, Ont. — A simple way to determine the security of your computer system is to check it against the following list of security "musts" concerning system controls in data security:

- Screen requests for new applications to determine their legitimacy, and to determine if continual use of the system by a given user yields more information than he is entitled to have.

- Use techniques such as verifying key input fields, balancing input fields to predetermined totals, using computer-generated input, and writing edit routines to check the accuracy and completeness of data.

- Design systems with adequate internal program controls to ensure the accuracy of data and the correctness of computations.

- Maintain counts of the records on files before and after processing, and reconcile file control totals for individual computer runs with transaction and input control totals.

- Compare output control totals with predetermined totals to ensure that no records were lost during processing.

- Design systems with exception reports of transactions rejected by the system.

- Design systems with helpful console error messages.

- Ensure that programmed controls are not being overridden, by performing periodic audit tests of the system.

- Provide the internal audit group with a copy of all operational program documentation for computer systems and notice of all system changes.

- Maintain an inventory of all tapes, disk files, programs and supporting documentation; update it regularly as system changes are made; and audit the inventory periodically.

- Keep periodic tests of production programs, program dumps or traces and transaction journals to provide an audit trail of computer systems.

This checklist was compiled by DCF Systems Ltd., 74 Victoria St., Toronto, Ont. M5C 2A5.

The Long Arm of NCIC

Law enforcement information networks around the country have really been earning their keep lately.

Officials in McClennan County, Texas, tracked two probation offenders through the National Crime Information Center and the Texas Crime Information Center. In addition, Illinois State Police learned through NCIC that a man they stopped on the highway was wanted for questioning by McClennan County officials.

Curiosity got the better of a Grand Haven, Mich., man who stopped a patrol car and asked the officer to show him how vehicles are traced through Michigan's computerized information network. The patrolman used the man's car for the demonstration and obtained a report that the vehicle was sought for traffic violations in two other cities.

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Some of the key questions you should be able to answer are:

- How specifically are system resource costs distributed to jobs? As thoroughly as hardware vendors break down my charges? Are the same units of measure used? [e.g. is a channel a separate resource from a device; is the costing unit hours?]
- Does the system present units consumed and charges summarized on account code structures suitable for distribution to users?
- If a job ties up a tape, or a private disk, and never does a single EXCP, is the tape or disk charged for? [It should be!]

- Can I differentially price TSO jobs?
- Can I charge 140% of my base rate for high priority mid-day runs and 85% of my base rate for low priority mid-night runs? How many ways can I break down "priority" for this purpose?
- Can I apply sliding charges for limited resources such as core or tape?
- Can I charge for forms consumption?
- Can I distribute any OS overheads [not measured directly by SMF] back to jobs, such as initiator and IOS functions? Equitably?
- Can I apply minimum charges?
- I establish a set of rates [for CPU, core, etc.] for each of my mainframes. Can I cause an entirely different set of rates to be applied to select group of users on that mainframe WITHOUT modifying the accounting software?
- Do I have to "dry up" my operating system to do daily costing [to cut down weekly or monthly "accounting system" overhead]?

CI Notes

AM Gets \$14 Million Order

CLEVELAND — The Data Systems Division of Addressograph Multigraph Corp. has received a contract worth more than \$14 million from National Data Corp. for electronic credit authorization terminals for gasoline service stations and for merchant locations honoring bank credit cards.

Japan OKs Burroughs Firm

DETROIT — The Japanese Government has approved Burroughs Corp.'s application to purchase a 50% equity interest in its Japanese distributor, Takachiho Burroughs Co., Ltd., which is currently a wholly owned subsidiary of Takachiho Koheki Co., Ltd.

Revenue for the Burroughs distributor in Japan from the sale of Burroughs products in 1973 was about \$113 million.

Honeywell Cuts Factory Force

PHOENIX — Honeywell is cutting its Series 6000 manufacturing work force here by about 200 employees and by 80 employees in San Diego. Because of design and production improvements the firm has been able to reduce the work force while increasing production schedules, a spokesman said.

Honeywell expects to exceed its 1973 shipments of over 200 Series 6000 systems this year, he said.

Employees are being added in engineering and marketing departments and efforts are being made to place the surplus employees in other jobs, he said.

AMS Supplies CDC

SUNNYVALE, Calif. — Advanced Memory Systems, Inc. has received a contract valued at \$11 million to supply add-on memory systems to Control Data Corp.

Deliveries have begun and will continue throughout the year.

Supershorts

Di/An Controls, Inc. will market and support in North America the Ferranti PT7 programmable terminal and other data communication products based on the Argus 700 computer. The agreement includes the right to manufacture in North America.

Micr Systems Ltd. has been appointed distributor in Eastern Canada for Lockheed Electronics Co.'s System III mini-computer.

Bunker Ramo's 1,000th ESIS electronic cash register has been installed at the Stop & Shop supermarket in Fairfield, Conn.

Diablo Systems, Inc. has delivered its 10,000th Series 30 disk drive.

Report Highlights Terminal Growth

European Banks Put Their \$ in DP

By Toni Wiseman
Of the CW Staff

LONDON — Over \$10 billion of DP equipment will be shipped to European banks in the 10 years ending 1982, according to a marketing forecast by Frost & Sullivan, Ltd.

Included in this amount are \$6 billion in mainframes and standard peripherals and \$4 billion in terminal systems and specialized banking equipment.

Bank terminals, in Frost & Sullivan's estimate, represent the largest sales potential. This type of equipment already represents half the installed value of DP equipment at branch level.

The next decade will be a period of reorganization and reequipment, the report said, with a trend toward paperless transactions and on-line operation, with all essential data being captured at branch level.

The European banks and giros have a present daily transaction volume of over 61 million, according to Frost & Sullivan, and this is growing at an annual rate of 10%. The report estimated that by 1982, the total number of banking transactions in Western Europe will have reached a level of 120 million a day.

The market analysis predicted mainframes and standard peripherals will be the largest sales sector, based on the present installation of some 1,500 computers in European banks.

The report estimated sales of \$520 million for this year, growing to \$650 million in 1978 where it will level off for the next four years.

Suit Alleges Spy Ring Was IBM's Own Idea

CW West Coast Bureau

SAN JOSE, Calif. — A superior court judge has rejected a claim that IBM created a ring to steal its own trade secrets.

Eleven persons have been arrested and charged with conspiring to steal IBM's plans for its 2314, 3330 and 3340 disk drives.

Their trial is set for April 1.

James Crew, an attorney who is seeking dismissal of the charges, claimed that in the late winter of 1973, IBM created the ring when it solicited and hired David Bourget to "create an alleged criminal conspiracy against it."

"IBM stole its own secrets and also tried to steal a few from Memorex," according to Crew.

He cited as the source of his claims the grand jury transcript.

Crew said he plans to appeal the judge's ruling to the U.S. Supreme Court, if necessary.

An IBM spokesman said the judge's ruling speaks for itself.

Bank terminals already represent 50% of the installed value of DP equipment at bank branches, the analysis stated, with remote batch and on-line terminals for data entry and teller terminal systems a growing market.

From an estimated shipment of \$76 million in bank terminals in 1973, the market will almost double to \$149 million this year, and grow to \$330 million by 1982, the report said.

Frost & Sullivan forecast an increase in present sales volume for OCR/Micr reader/sorters up to 1975 when the equipment of German banks, which have adopted OCR-A font as a standard, should be complete.

Sales will rise from \$56 million this year to \$62 million in 1975 and then decline to \$11 million by 1982.

The related Micr/OCR encoders will follow a similar sales pattern, climbing to \$63 million in 1975 and reaching a low of \$8 million in 1982.

Cash dispensers will also be much in demand, according to the report. Shipments will reach \$18 million by 1982, up from an estimated \$5 million this year.

Germany is now and will remain the largest market for EDP shipments, followed by France and the UK, the report said.

In terms of manufacturers, IBM has an estimated 65% of the total market. However, the survey indicated NCR is second most favored for future requirements in the banking sector.

Frost & Sullivan said that there is sizeable opportunity for smaller companies with good ideas to make substantial sales in the European banking sector, particularly in the software area.

The market analysis includes commercial and savings banks, government-sponsored giros, building societies, agricultural credit installations and cooperative and people's banks.

Independents Laud IBM Decision To Extend 2260 Base Support

By Molly Upton
Of the CW Staff

NEWTON, Mass. — "Absolutely delighted," "generally very pleased," "we think it's great," were some of the reactions of makers of 2260-type terminals to IBM's decision to support 2260s and 2265s under 370 data base management [CW, Jan. 9].

Vendors surveyed by *Computerworld* indicated they thought the threat of an antitrust suit by Sanders was a strong motivator in IBM's decision.

"I would consider it part of a settlement between Sanders and IBM to get Sanders to agree not to file an antitrust suit," observed Joseph Norton, manager of systems application engineering at ITT.

'Healthy Move'

"I think it's a healthy move. I don't think it's the first move in that direction, but part of a continuing trend to where IBM is being forced to consider the other people in the market," Norton said.

"We take our hat off to Sanders," said Tom McEachran, national product manager at Wyle Computer Products, Inc.

With IBM facing the government in an antitrust case, McEachran said he thought IBM saw the move as a way in which it could give a concession that didn't cost a lot of money.

"The decision didn't cost IBM any money, as the 2260 had been written off long ago," he said.

McEachran said he was sure IBM would have preferred not to support 2260s under 370 data base, but "it's a minor concession. With the amount of sales they

have annually, I don't think they'll really even feel it," he noted.

Asked whether this move indicated a chink in the mammoth's armor, McEachran said he didn't think so. "A chink only occurs in IBM's armor when they allow it to happen."

Barry Maser, vice-president of marketing at Delta Data Systems, said: "It's pretty tough to chink IBM's armor; whatever they've done they're going to come out ahead." The 2260-type market is relatively stagnant, he said.

"The decision will prolong the life of the units, particularly since over a period of years devices that started out being 2260-compatible went on to extend the capability and used newer technology than IBM had," Norton said.

CMC British Unit Sold for \$10 Million

SANTA MONICA, Calif. — Computer Machinery Corp. has sold its British subsidiary for \$10 million to Multifinance N.V. of The Netherlands and a group of the subsidiary's executives.

CMC President Thomas L. Ringer said the agreement eliminates the need for any equity-type financing in 1974.

The subsidiary accounted for \$8.2 million or 16% of CMC's 1973 revenues.

During the next 60 days CMC will receive \$6.5 million, which includes \$3 million in repayment of the subsidiary's debt, resulting in a gain of about \$2 million, the firm said. The remaining \$3.5 million will be paid quarterly.

PACE

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- ASP does all the same things as HASP and compounds the problem with multiple mainframes. It also does some utility jobs without calling OS at all. What about it?
- How many ways can a user get a job executed and beat the accounting system?
- If I try to minimize SMF overhead [e.g., with an 8K buffer] how much revenue producing data do I risk if the system crashes?
- I have a TP operation [IMS, CICS, ATS, CRJE, in-house created, etc.] which runs twelve hours a day. How much revenue producing data can I lose if the system crashes?
- Are the utilization statistics based on accurate and complete information?

- What about operator tape and disk mount activity? Responses to console messages? Can I charge for it? Is it even measured?
- How is system downtime accounted for? [There's only one guaranteed way!]
- Does the "billing" system just calculate a job charge or does it generate a true invoice?

The DAS lists at \$10,800. It does everything listed above and more, and is, we feel, the most thorough job utilization and costing software product in the field. We have over one hundred DAS packages installed, and we plan to have a great many more.

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Versatec 200 Point/In. Plotter Probably to Be Introduced in June

By Marvin Smalheiser
CW West Coast Bureau

CUPERTINO, Calif. — Versatec, producer of electrostatic printers and plotters, plans to introduce a unit with a resolution of 200 point/in., probably in June.

H. Milton Reed, vice-president, marketing, said the company plans to produce large plotters and new techniques for writing electrostatically.

Last June Versatec introduced what it claims is the highest resolution in the industry, 160 point/in., and the acceptance, Reed said, has been "excellent."

Sales since June have been a little over 100.

"The higher resolution base," he said,

"sometimes opens up a broader application base."

Versatec feels the electrostatic technique is finally being fully accepted, according to Reed.

"It has been in a nascent state but now it is shown to be a truly proven technique. Our units are the first electrostatic devices accepted as part of a product line by a major computer manufacturer," Reed noted.

He referred to Digital Equipment Corp., which has made electrostatic devices a part of its product line.

Versatec's market is primarily with small and medium computer users for applications ranging from oil exploration to engineering and commerce.

"Wherever minis go," he said, there is a potential market.

Reed cited a trend to getting more meaningful data onto paper and the ability of Versatec's printer to put both statistics and graphs together on the same printout.

The trend to CRTs, he said, is not a threat. Rather, it may enhance the need for hard copy.

"There is definitely a need for more CRTs than hard copy, but there will always be a need for hard copy."

Founded in May 1969, Versatec first introduced an 8-1/2 inch printer/plotter that reached the market in 1970. It subsequently introduced 11-inch and 20-inch printer/plotters and now a 72-inch plotter may be within reach, Reed said.

Versatec has an installed base of 1,100 to 1,200 machines and Reed said shipments are 75 to 100 machines a month.

It will introduce its technology to mainland China this year through an arrangement with a distributor in Japan. It also plans to market in Central and South America this year.

Scarcity of Custom Chip Delays New MSI Unit

COSTA MESA, Calif. — Inability to procure a custom LSI chip in sufficient quantities is causing a delay in shipment of MSI Data Corp.'s new Source 1100 field data entry unit, the firm said.

MSI is switching vendors for the chip.

MSI has to make a few design modifications to accommodate the change, and this, combined with the vendor's lead time, will impact shipments by about 90 days, according to Gary Liebel, vice-president, marketing.

The 1100 is not a principal source of revenue at this time, since it is a new product, that was first shipped about six months ago, he noted.

The shipment delay will cause the backlog to increase, he said. As of Dec. 29, the total backlog was \$13.5 million, including \$1.4 million for the Source 1100.

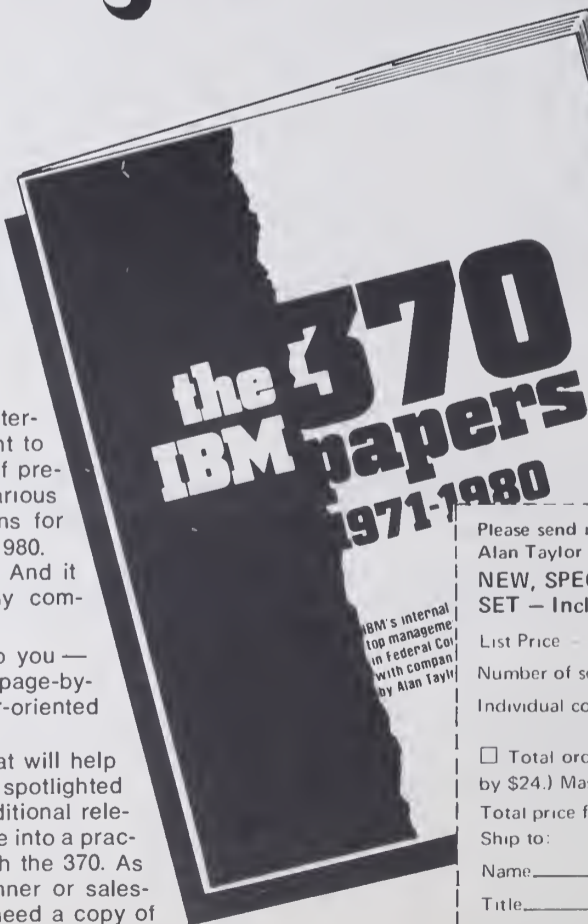
Here's what you always wanted to know about your IBM 370.

Never before has so much confidential information been available to the computer user.

Thanks to actions in Federal Court, IBM's internal papers on its IBM 370 have been brought to light. These "Greybooks" contain a wealth of previously unavailable information on the various models of the 370 — including detailed plans for last year, next year, and every year through 1980. Even IBM salesmen haven't seen most of it. And it can be an invaluable planning tool for any computer installation.

Now these Greybook reports are available to you — in clear, easy-to-read book format — with a page-by-page commentary by the well-known, user-oriented columnist, Alan Taylor.

Almost every page has some information that will help your installation. Alan Taylor's commentary, spotlighted by a specially designed format, provides additional relevant information, and helps make each volume into a practical, useful tool for everyone concerned with the 370. As user, manager, controller, programmer, planner or salesman, there is something here for you. You need a copy of one or more of these books for your professional purposes — and you will want your colleagues to have their own copies so that you can work together.



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- IBM's own analysis of the advantages and disadvantages of 370 models against the competition. (Your Software and Hardware experts both need this information.)
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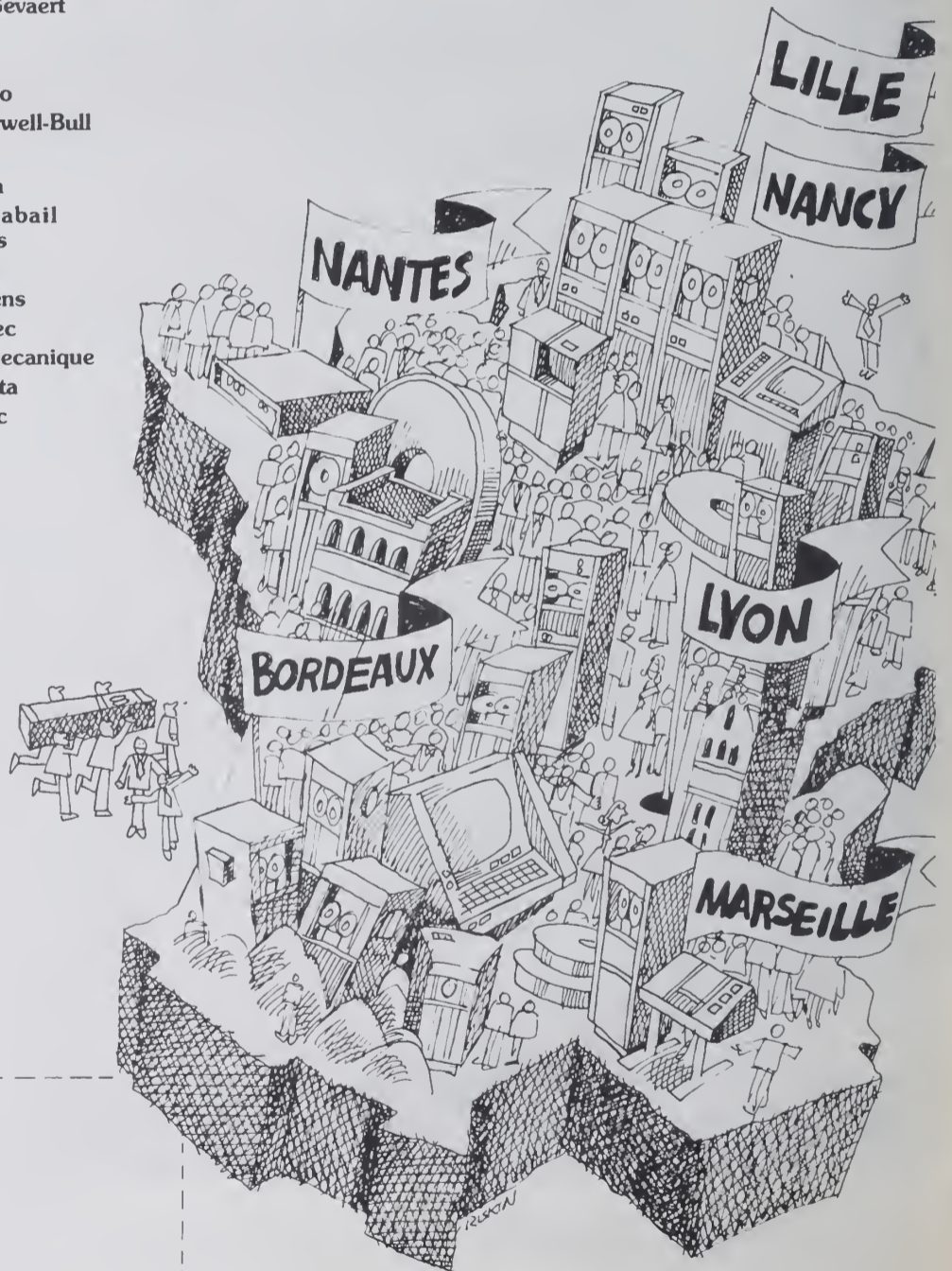
The travelling computer users forum and exposition will tour Europe's second largest computer market starting next February in Lyon. And several excellent companies have already reserved one or more booths for the exposition. We'd like to welcome them.

The French Computer Caravan also has an excellent name as co-sponsor — *Zero-Un-Informatique*, a leading computer industry publisher of both a weekly newspaper and a monthly magazine. *Zero-Un-Informatique* will provide local identification and promotion, and will assure that La Caravane Informatique is responsive to the current needs of French computer users, with locally run forums, workshops and seminars.

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March 5-7	Marseille	Palais de Congres
March 12-14	Bordeaux	Foire Internationale
March 19-21	Nantes	Foire de Exposition
March 26-28	Lille	Palais de Expositions
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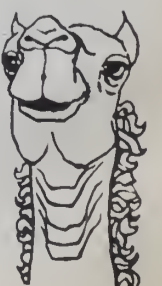
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Burroughs, Univac Realign Europe Setup

With the European market becoming increasingly important to U.S. DP firms, Burroughs and Univac have realigned their European organizations.

Univac established a consolidated European Division headquartered in London, which includes all marketing and services operations in Western Europe, the Comecon countries, the Middle East and South Africa.

The new unit consists of the Northern European Division and the Central European Division. John Butler, formerly vice-president and general manager of the Northern European Division, holds the same titles for the new European Division.

The new organization was dictated by "the tremendous growth" which Univac has experienced during the past five years throughout Europe, according to Harry A. Steinberg, executive vice-president, worldwide marketing and services.

"Our situation has matured to the point where this new structure will provide better support for our expanding subsidiary functions, enhance our ability to respond sooner and more effectively to the needs of our customers and promote the continued growth of our business," he added.

Four new regional offices will be established, each under the direction of a vice-president and regional manager reporting to Butler:

Data General Installs Its 500th UK System

COWES, ISLE OF WIGHT, England - Data General Ltd. has installed its 500th system in the UK here, a Nova 1200, at Plessey Radar, where it is part of a demonstration environmental monitoring system.

Region 1, headquartered in London, covers the UK, Yugoslavia, Turkey, Israel, Iran and South Africa.

Region 2, Rome, includes Italy, Belgium, France, Spain, Portugal and Greece.

Region 3, Amsterdam, comprises The Netherlands, West Germany, Switzerland, Austria, Poland, Russia, Hungary, Bulgaria and Czechoslovakia.

Region 4, Stockholm, consists of Sweden, Denmark, Norway and Finland.

A fifth marketing area based in London will be responsible for marketing operations in the Soviet Union.

At Burroughs, a restructuring

of the European operations has made the Burroughs International S.A. (Bisa) organization responsible for all of Burroughs marketing activities in Europe, Africa and the Near East, with Burroughs Machines Ltd. of Great Britain becoming a part of that organization.

"This change reflects Britain's entry into the Common Market and provides the company with a unified organizational structure in Europe with which to further support Burroughs growth programs in the important European market for data processing systems and business products," Chairman Ray W. Macdonald said.

Sanders Replaces 2260 Net at Esso

LONDON - Esso-Europe has ordered programmable terminals from Sanders Data Systems, Ltd., for use in a national computerized management information system throughout the UK.

Three of the Sanders 810 systems, which control 20 local terminals, have been installed at Esso House here, replacing an IBM 2260/2265 network.

Other Orders & Installations

University of Bologna, Italy, has installed a 98K Honeywell 6030 computer, equipped with nine video terminals, three high-speed printers, card equipment and a front-end Datanet 355 processor.

In addition to handling administrative tasks, the system is being programmed for statistical research on the university population, automation of the student library and for "business games."

Lahtis Glasbruk, Finnish glassworks, has ordered a real-time minicomputer system from Asea

LME Automation Co.

Asian Computer Services, Republic of Singapore, has ordered the AR-70 Computerized Accounts Receivable data service from Computer Systems & Education Corp.

Foreign Orders & Installations

South China Morning Post, Hong Kong, has ordered Chinese language phototypesetting machines from Photon, Inc.

WSOY, Finnish publishing house, has ordered a Univac 90/60 system for handling typesetting using the Linco IV software program and for invoicing, inventory and production control using the Univac IMS/90 package.

E.T. Barwick Mills, Ltd., England, has ordered a Honeywell Model 2020 computer to process customer orders.

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SRI Scientists Say

Lower Costs Spark DP Growth in Factory

MENLO PARK, Calif. — Plummeting costs of computers and memories are sparking the rapid growth of computerized automation, according to an article in *Investments in Tomorrow*, published by Stanford Research Institute (SRI).

A mini-based control system that cost \$100,000 five years ago would cost about \$25,000 today, observed David Penning, senior industrial economist at SRI.

By 1980, the price of such a system may have dropped to between \$5,000 and \$10,000, and computerized manufacturing will have penetrated further into a variety of industries, he said.

In a recent survey, managers said they intend to automate equipment monitoring and data collection at the same time they automate test and fabrication operations.

The reduced costs of memory will make it feasible to use higher level languages so that someone who is not a programmer can instruct the system to perform different jobs, the article said.

Currently, computer-based automation makes economic sense for the electronic manufacturer and Penning expects this industry to "be a spearhead for automation because this industry is familiar with computer-based electronic control techniques and therefore has the ability to adapt such techniques easily to production requirements."

Electronic components are frequently so complex that only a computer can test them rapidly enough to make testing economically feasible, he observed.

In addition, the manufacturer can consider changes in produc-

tion equipment because products frequently become obsolete, rather than waiting for his production equipment to wear out, Penning said.

Programs Under Contract

Scientists at SRI are developing both programs and hardware for a variety of programmable systems under a contract with the National Science Foundation.

The two-year project is designed to develop easily programmable manipulating, visual sensing and inspection systems and finally, an integrated assembly and inspection system that incorporates materials handling, acquisition, assembly and inspection operations all easily programmable and potentially cost-effective, the article reported.

Within two years, staff scientist Charles A. Rosen expects to have simplified the software so it can be used in a self-standing minicomputer-controlled system that would be cost-effective in the factory.

Increased use of computer automation "could eliminate many undesirable jobs," Rosen said, "and provide new man-machine relationships requiring more human intelligence and thus restoring man's purpose and dignity."

Factory workers would be relieved of the relatively low-level jobs that machines could do, and could work on such tasks as programming the assembly, inspection and materials handling systems as well as repair and maintenance of the systems, the article said.

Burroughs Names 5 Vice-Presidents

DETROIT — Two manufacturing and engineering executives and three marketing executives have been elected corporate vice-presidents of Burroughs Corp.

They are Lloyd W. Cali, vice-president and group executive, computer systems group; Robert

J. O'Connell, vice-president and group executive, components group; Charles W. Peace Jr., vice-president, marketing, Eastern region, business machines group; Cam R. Stark, vice-president and president of Burroughs

Executive Corner

International S.A., Fribourg Switzerland.

Irwin R. Rector was named vice-president and managing director of Burroughs Machines Ltd., Great Britain.

"The recent reorganization of our manufacturing and engineering activities places worldwide responsibility for the development and manufacture of related products within individual operating groups," Chairman Ray W. Macdonald commented.

The computer systems group operates six plants in the U.S. and one in Belgium.

The components group operates four plants in the U.S. and one each in Brazil, Mexico and the UK.

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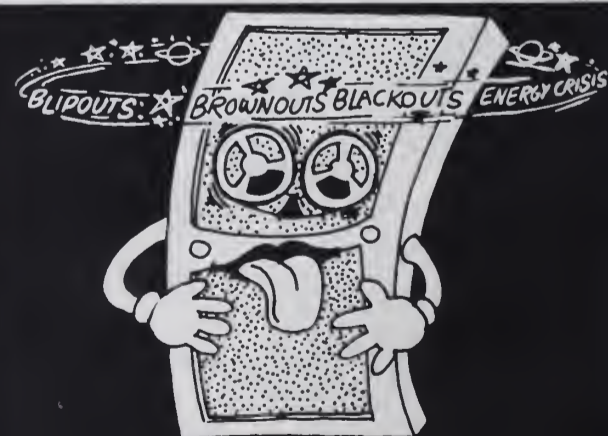
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Unidata's First Aimed at 370/115, Inherits Features of 'Parents'

PARIS — Barely six months after CII, Siemens and Philips agreed to form Unidata, that firm has announced its first computer, the Unidata 7.720.

It is, according to industry sources, comparable to the IBM 370/115, and aimed at the same market. The 7.720 is the first member of the 7000 Series which is expected to eventually consist of six or seven models.

The new computer has "inherited" features of some of its parents' products, specifically Siemens DOS4004 with the addition of virtual memory, Philips

semiconductor technology and some CII peripherals.

The system can also use either CII or Philips object code.

The 7.720 has a dual memory — a central memory of 48K to 160K with MOS/LSI technology, and a rechargeable control memory which contains the system's microprograms (8K to 16K words or 48 bits).

The 7.720 offers three card readers ranging in speeds from 300- to 1,000 char./min, as well as card punches and three types of printers ranging in speed from 200- to 1,200 line/min.

ICL May Unveil Top of New Series

LONDON — ICL is expected to unveil two members of its New Range Series very shortly, according to an article in *The Financial Times*.

The units, purported to be the P3 and P4, will represent the top of the line. The P3 is thought to be big enough to compete with the IBM 370/195 and future enhancements, while the P4 will be in the 370/158 range.

Communications Oriented

Both machines are highly communications-oriented and suitable for operation in multiprocessor configurations, according to reports.

Either the 2903, already introduced, or its immediate successor will be called the P1 or P0, the article continued.

The T versions of the 1902 through 1905 will be marketed in parallel with the 2903.

Plans announced before the energy crisis called for production of 50, 2903s a month by late spring, rising to 100 a month by 1975, when revenues would be in the neighborhood of \$219 million. The lease/sale ratio was set at 44 months.

Operating systems for the P3 and P4 are said to have been up and running for a year.



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Our major one-day seminar for the U.S. is called the Industry Briefing Session. And it will include:

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- Minicomputers — continued surge in 1974?
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- Governmental impact on the computer industry — threat to industry growth?

Special address by Dr. Herbert Grosch

Dr. Grosch, editorial director of *Computerworld*, former head of the National Bureau of Standard's research program in computing technology, and renowned author of "Grosch's Law," will give a luncheon talk on *Computing: The Next 10 Years*. He will describe the

possible in terms of hardware and software technology, but will also cover the probable changes in worldwide user acceptance of new techniques.

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We've added a second day to our 1974 Briefing Session seminar to give proper attention to the rapidly expanding international marketplace. The day will be divided into two parts:

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This session will include:

- User spending in Germany, France and U.K.
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- Installed base by supplier, country and industry
- Data entry and terminals — status and trends
- The software industry in Europe

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- Business environment in Japan — impact of energy crisis
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- Governmental planning and EDP policy — liberalization of restrictions on externally produced EDP equipment.

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Special note to financial analysts: We've set aside a special day (Feb. 26) for you in New York. It will cover the material included in our Industry Briefing Session, but the discussion — and audience participation — will be aimed at investor interests. Join some of Wall

Street's best computer watchers at this seminar!

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Our New York Computer Industry Briefing Session is coming up very soon, and whether you want to attend the Industry Briefing Session Day or International Day or both, now's the time to make your reservations. The coupon has all the details on time, place and costs. If computer marketing is your field, fill it out right now and you'll be sure of a place when the information starts flowing. You couldn't pick a more productive way to spend a day.

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The Data Base Approach—Yes or No
Major Elements of Data Base Systems
THE COST/BENEFIT DECISION
The Basic Data
The Cost/Benefit Model
THE STAFFING COMMITMENT
Job Descriptions
Personnel and Training

DATA BASE PACKAGE EVALUATION AND SELECTION

STRUCTURING THE EVALUATION
The Evaluation Team
The Evaluation Process
FOUR DATA BASE SYSTEM PACKAGES
IMS, TOTAL, S2000, ADABAS
Technical Descriptions
Qualitative Comparisons
MAKING THE SELECTION
Matching the Problem and the Package
A Package Selection Case Study

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HS vs. HD Selection Criteria
Physical Data Base Design Efficiencies
Workshop—Physical Data Base Design
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Workshop—Logical Data Base Design
DIRECT ACCESS METHODS
HIDAM vs. HDAM Selection Criteria
Workshop—HD Method Design
Design Simulation for Performance
Workshop—Data Base Design Optimization
IMPLEMENTATION EFFICIENCIES
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WHO IS PDC?

Performance Development Corporation is one of the few professional organizations in the country concentrating the major portion of its talent in Data Base. In both public and in-house education. In design and implementation consulting. In preparing reports such as "Data Base Management Systems: A Critical and Comparative Analysis." In video courses and the "Data Base Newsletter." We have been selected by the AMA to prepare and present their winter-spring Data Base series. And to join with Aetna Life in giving public seminars in the Hartford area. If it's Data Base, we're into it.

LEO J. COHEN

President and principal consultant of PDC... more than 18 years experience in finding and implementing feasible solutions to practical problems in many systems areas... has designed and implemented two major performance simulators, S3 and SAM, a number of operating systems, the COMMEN compiler, and 8 data base systems... a nationally known lecturer in the data base and system performance fields, has lectured for the Professional Development Committee of the ACM in both of these areas, is an ACM National Lecturer, and currently participates in the AMA Data Base Design Seminar... principal author of the report, "Data Base Management Systems: A Critical and Comparative Analysis," and the video course "Data Base Concepts and Methods"... has been invited speaker and panelist at many national meetings.

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Univac Boosts Sperry Earnings

NEW YORK — Sperry Rand Corp. reported record earnings and revenues for both the third-quarter and nine-month periods ended Dec. 31, 1973.

Chairman J. Paul Lyet said the results reflect strong performances by several key areas of the company. He specifically cited the high order rate for Univac computer systems and shipments in the machinery products and guidance and control sectors.

Univac, the company's largest division, had increases in shipments, revenues and new orders through the three quarters at rates ahead of computer industry averages, he said.

For the three months, earnings rose 26% and revenues 15% over the same quarter last year.

Third-quarter earnings totaled \$29.6 million or 86 cents a share, on revenues of \$649.2 million.

This compares with earnings of \$23.4 million or 68 cents a share, on revenues of \$565.4 million for the same period last year.

Nine-month earnings jumped 29% while revenues rose 18% over those of a year ago.

Earnings for the nine months reached \$78.7 million or \$2.29 a share, on revenues of \$1.879 billion. For the comparable period a year ago, Sperry reported earnings of \$60.8 million or \$1.77 a share, on revenues of \$1.594 billion.

Expectations Met

"Based on results through our third quarter, Sperry management is holding to its original plan for revenue and earnings increases for the current fiscal year which ends March 31, 1974," Lyet said.

"We are being asked constantly about the effects on our business of the energy shortage in the U.S. and other nations, especially in Western Europe and Japan," said Lyet. "Up to now we have seen little or no impact on incoming order rates or in cancelled or drawn-out deliveries of products on order.

"We are seeing some production delays due to shortages of materials from certain suppliers but this situation began well before the Arab oil embargo.

"In addition, we have had some problems maintaining adequate margins on certain consumer products which are produced overseas, but this area represents less than 5% of our total revenues," he noted.

Sperry's backlog of all business was \$1.83 billion on Dec. 31, 1973 compared with \$1.42 billion on the same date last year and \$1.39 billion at the beginning of its present fiscal year.

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Position Announcements

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Applicants with a Ph.D. or equivalent in Computer Science, with research interest in Computer Programming Languages and Compiler Construction may apply to Dr. A.A. Mufti, Head of the Department of Computer Science.

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Send resume and salary requirements to Lincoln Income Life Insurance Company, P.O. Box 1173, Louisville, Kentucky 40201 or contact the Personnel Director at (502) 459-5654.

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The quality and scope of the Hospital Systems utilization will depend on this individuals ability to maintain a technically competent staff as well as his ability to evaluate ongoing projects, and further the development and implementation of on-line hospital applications. His many responsibilities include the coordination of the Hospital Systems Division with users in management, financial, and patient care departments.

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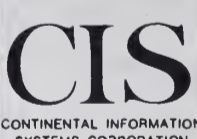


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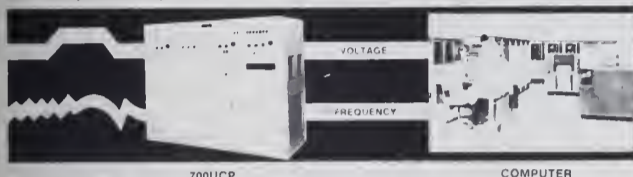
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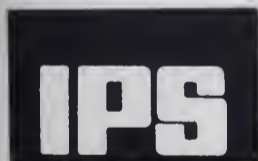
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On-Line Systems, Applied Logic

Earnings Picture Improves at T/S Firms

Two time-sharing firms turned in improved results in recent fiscal periods.

On-Line Systems, Inc. reported record first-half earnings and revenues, while Applied Logic cut its losses on record revenues.

On-Line Systems' earnings for the six months ended Oct. 31 climbed to \$661,891 or 82 cents a share from \$235,060 or 30 cents a share a year ago.

Revenues rose to \$4.4 million from last year's \$2.9 million.

President Jack Roseman attributed the improved results to in-

creased usage by existing customers of proprietary programs, particularly in data base management and business/financial planning applications.

Applied Logic cut its loss for the year to \$46,491 or 2 cents a share from a loss of \$271,061 or 15 cents a share in 1972. The firm said the 1973 loss was incurred because of "operational difficulties" in the fourth quarter.

Revenues, however, reached a record \$3.2 million compared with \$2.8 million a year ago.

...Toward the Bottom Line

Commercial Credit, a subsidiary of Control Data, has registered with the SEC a planned public sale of \$100 million senior notes, due 1981. Proceeds will be used to reduce short-term debts and augment working capital.

\$\$\$

Data Electronics, manufacturer of terminal keyboards, has completed financing for \$450,000 through equity and long-term notes.

\$\$\$

Auxton Computer Enterprises is aiming at the \$6 million mark for 1974 revenues, President John P. Croxton noted in a recent letter to shareholders. He said in the software company's four-year existence it has generated sales of \$7.5 million and pretax profits of \$1 million on an initial investment of only \$300,000.

\$\$\$

Datronic Rental said its offer to purchase up to \$500,000 principal amount of its 7% convertible subordinated debentures due March 15, 1984, expired on Jan. 7 and will not be extended.

Stockholders reap rewards! Raytheon has declared a regular quarterly dividend of 17-1/2 cents a share, payable Jan. 25 to stockholders of record Jan. 11.

\$\$\$

Dearborn-Storm has issued its eighth consecutive quarterly dividend of six cents a share payable Jan. 25 to shareholders of record Jan. 4.

\$\$\$

The Palmer Organization has invested \$250,000 in Storage Technology Corp.

\$\$\$

Boothe Computer now has aggregate indebtedness to GAC Finance of some \$48 million following the acquisition by GAC of 95% of Boothe's outstanding 6% subordinated notes due 1977. The two companies recently reached an agreement in principle to restructure that debt.

\$\$\$

AGS Computers estimates its fourth quarter will be consistent with the first nine months of the year and that the first quarter of next year will show record sales.

Cambridge Net

Doubles in Quarter

CONCORD, Mass. — Revenues and earnings more than doubled in the first quarter ended Dec. 1 at Cambridge Memories, Inc.

The memory maker reported earnings of \$240,869 or 18 cents a share compared with \$118,099 or 9 cents a share in the year-ago quarter. Last year's figures included a \$57,000 tax credit.

Revenues rose to \$5 million from \$1.9 million for the corresponding period last year.

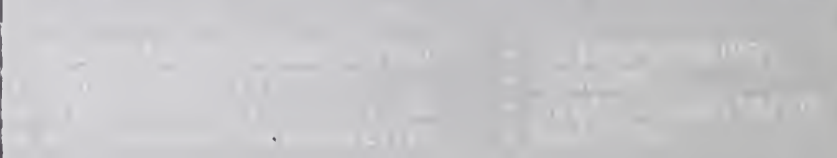
"Customer acceptance of new products introduced last year continues to be very good. The company's revenue growth in the first quarter reflects initial shipments of several of these products, as well as a continuation of increasing demand for all major add-on and minicomputer memory systems," President Joseph F. Krzy said.

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Earnings	698,000 (277,000)
9 Mo Shr	.08
Revenue	107,117,000 a85,145,000
bSpec Item	464,000 432,000
Earnings	1,126,000 (2,080,000)

a-Restated to exclude sales of subsidiary sold Feb. 28, 1973. b-In 1973, gain on sale of investment; in 1972, gain on sale of subsidiary.

DATA GENERAL	
Three Months Ended Dec. 22	
1973	1972
Shr Ernd	\$.23
Revenue	14,837,000 9,827,000
Earnings	1,855,000 1,252,000

a-Adjusted to reflect a three-for-one stock split in March 1973.

APPLIED MAGNETICS	
Three Months Ended Dec. 31	
1973	1972
Shr Ernd	\$.05
Revenue	12,783,000 10,389,000
Earnings	201,000 425,000

IBM	
Year Ended Dec. 31	
a1973	1972
Shr Ernd	(000)
Revenue	\$10.79 b\$8.83
Earnings	10,993,242 9,532,593
3 Mo Shr	1,575,467 1,279,268
Revenue	3,240,216 2,521,729
Earnings	468,722 340,427

a-Preliminary. b-Adjusted to reflect five-for-four stock split in May 1973.

INTEL	
Year Ended Dec. 31	
1973	1972
Shr Ernd	\$2.12 a\$.74
Revenue	66,170,000 23,417,000
Tax Cred 1,104,000
Earnings	9,214,000 3,084,000

a-Adjusted for a three-for-two stock split in April 1973.

GOULD	
Three Months Ended Dec. 31	
1973	1972
Shr Ernd	\$.90
Revenue	185,978,000 148,491,000
Earnings	7,630,000 6,222,000
6 Mo Shr	1.61 1.29
Revenue	357,679,000 280,402,000
Earnings	133,628,000 10,863,000

BURROUGHS	
Year Ended Dec. 31	
1973	1972
Shr Ernd	(000)
Revenue	\$6.01 \$4.71
Earnings	1,284,242 1,052,783
3 Mo Shr	a115,890 87,541
Revenue	2.57 2.08
Earnings	388,980 330,053

a-Includes \$2.5 million from sale of securities.

COMPUGRAPHIC	
Three Months Ended Dec. 31	
1973	1972
Shr Ernd	\$.60
Revenue	13,350,000 10,128,000
Earnings	1,100,000 710,000

TECHNALYSIS	
Three Months Ended Sept. 30	
1973	1972
Shr Ernd	\$.06
Revenue	321,377 301,708
Tax Cred 1,300
Earnings	30,500 23,492
9 Mo Shr	.15 .11
Revenue	1,001,845 884,357
Tax Cred 4,050
Earnings	83,500 58,400

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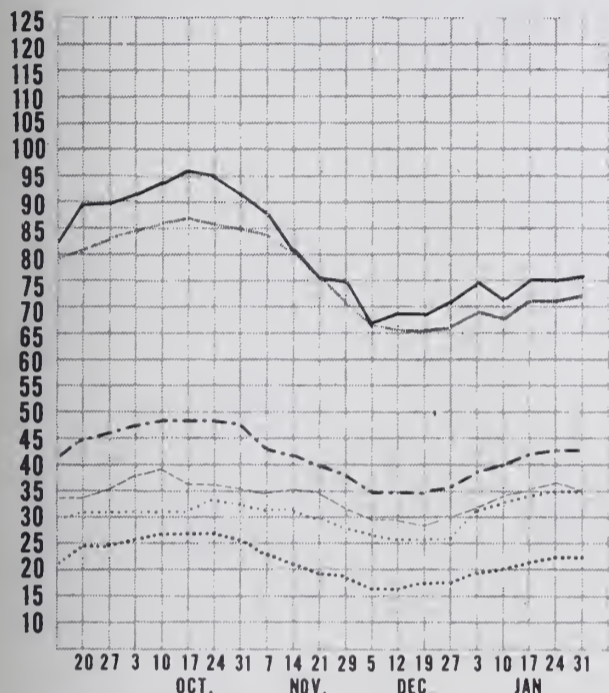
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PRICE						PRICE						PRICE											
1973-74		CLOSE	WEEK	WEEK		1973-74		CLOSE	WEEK	WEEK		1973-74		CLOSE	WEEK	WEEK							
RANGE		JAN 31	NET	NET		RANGE		JAN 31	NET	NET		RANGE		JAN 31	NET	NET							
(1)		1974	CHNGE	CHNGE		(1)		1974	CHNGE	CHNGE		(1)		1974	CHNGE	CHNGE							
COMPUTER SYSTEMS																							
N	BURROUGHS CORP	175-252	195 1/2	- 1/4	-0.1	O	ADVANCED COMP TECH	1- 2	1 1/4	- 1/8	-9.0	O	COMPUTER COMMUN.	1- 4	1 1/8	0	0.0						
N	COLLINS RADIO	16- 26	24 3/4	0	0.0	A	APPLIED DATA RES.	2- 4	2 1/8	0	0.0	A	COMPUTER EQUIPMENT	1- 3	2	+ 1/4	+14.2						
O	COMPUTER AUTOMATION	5- 20	10 3/4	-1	-8.5	O	APPLIED LOGIC	1- 3	1 1/4	0	0.0	O	COMPUTER MACHINERY	4- 13	5 1/8	- 1/8	-2.3						
N	CONTROL DATA CORP	31- 62	34 5/8	+2 1/8	+6.5	N	AUTOMATIC DATA RRDC	39- 94	47 1/8	-6 5/8	-12.3	O	COMPUTER TRANSCIVER	1- 6	1 3/4	+ 1/4	+16.6						
D	DATA GENERAL CORP	28- 49	36	- 5/8	-1.7	O	BRANSON ANALOG SYST	1- 1	5/8	- 1/8	-16.6	N	CONRAD CORP	13- 32	16 1/8	+1 7/8	+13.1						
D	DATAPoint CORP	10- 21	13 1/2	+1	+8.0	O	CENTRAL DATA SYSTEMS	3- 9	6	+1 1/4	+26.3	O	DATA ACCESS SYSTEMS	1- 3	1 1/4	0	0.0						
D	DIGITAL COMP CONTROL	2- 6	2 1/8	0	0.0	O	COMPUTER DIMENSIONS	1- 5	2 1/4	0	0.0	O	DATA 100	9- 19	10 1/2	+ 3/8	+3.7						
N	DIGITAL EQUIPMENT	73-117	102 3/4	+2 1/4	+2.2	D	COMPUTER DYNAMICS	1- 2	1 1/2	0	0.0	A	DATA PRODUCTS CORR	2- 5	3 3/4	0	0.0						
N	ELECTRONIC ASSOC.	2- 9	2 3/4	- 1/4	-8.3	D	COMPUTER HORIZONS	1- 6	3 1/2	- 1/4	-6.6	O	DATA RECOGNITION	2- 3	1 1/4	-1 1/4	-83.3						
A	ELECTRONIC ENGINEER.	6- 14	9 1/8	+ 1/4	+2.8	D	COMPUTER NETWORK	1- 5	1 7/8	+ 3/8	+25.0	O	DATA TECHNOLOGY	1- 5	3	+ 1/2	+20.0						
N	FOXBORO	23- 48	45	- 1/2	-1.0	D	COMPUTER TASK GROUP	1- 2	3/4	0	0.0	O	DECISION DATA COMPUT	6- 40	8 1/2	+1 7/8	+28.3						
O	GENERAL AUTOMATION	22- 55	33 1/2	-1 1/4	-3.5	O	COMPUTER TECHNOLOGY	1- 3	1 1/2	0	0.0	O	DELTA DATA SYSTEMS	1- 4	1 1/2	+ 1/8	+20.0						
O	GRI COMPUTER CORP	1- 3	3/4	0	0.0	O	COMPUTER USAGE	3- 9	3 3/4	0	0.0	D	DI/AN CONTROLS	1- 4	1 1/2	0	0.0						
N	HEWLETT-PACKARD CO	70- 99	82 1/4	+1 7/8	+2.3	O	COMRESS	1- 2	1 1/4	0	0.0	N	ELECTRONIC M & M	3- 6	3 7/8	- 1/4	-6.0						
N	HONEYWELL INC	68-139	81 3/8	-2 5/8	-3.1	O	COMSHARE	2- 9	3	+ 1/2	+20.0	O	FABRI-TEK	2- 5	2 5/8	+ 1/4	+10.5						
N	IRM	227-340	245 1/4	-1 1/4	-0.5	N	CORDURA CORR	3- 15	3 1/4	0	0.0	O	GENERAL COMPUTER SYS	3- 9	3	0	0.0						
O	INTERDATA INC	7- 14	10 3/8	- 1/8	-1.1	D	DATATAB	1- 4	1 5/8	+ 1/8	+8.3	N	GENERAL ELECTRIC	56- 76	59 7/8	-4 3/8	-6.8						
O	MICRODATA CORP	2- 10	3 3/4	+ 1/8	+3.4	A	ELECT COMR PROG	1- 2	1 1/4	- 1/4	-50.0	N	HAZELTINE CORR	4- 9	6 3/8	+ 3/8	+6.2						
N	NCR	27- 46	33	+ 3/4	+2.3	N	ELECTRONIC DATA SYS.	16- 56	17	-1 1/8	-6.2	O	INFORMX INC	3- 23	4 3/8	- 5/8	-12.5						
N	RAYTHEON CO	22- 35	33 1/4	+1 5/8	+5.1	O	INFONATIONAL INC	1- 2	1 1/4	0	0.0	D	INFORMATION DISPLAYS	1- 2	3/8	0	0.0						
N	SINGER CO	35- 74	37 1/2	- 1/2	-1.3	O	INFORMATICS	2- 7	6 5/8	+ 1/2	+8.1	O	INFORMATION INTL INC	8- 15	11 1/2	- 1/4	-2.1						
N	SPERRY RAND	36- 56	40 5/8	+ 3/8	+0.9	O	I.O.A. DATA CORP	1- 1	1/4	- 1/8	-33.3	A	LUNDY ELECTRONICS	3- 9	2 7/8	0	0.0						
A	SYSTEMS ENG. LABS	1- 8	2	+ 1/8	+6.6	O	IPS COMPUTER MARKET.	1- 5	1 1/4	0	0.0	O	MANAGEMENT ASSIST	1- 1	3/8	0	0.0						
N	TEXAS INSTRUMENTS	83-138	112 1/2	+3 1/2	+3.2	O	KEANE ASSOCIATES	2- 5	2	0	0.0	N	MEMOREX	2- 19	2 1/2	- 1/8	-4.7						
D	ULTIMACC SYSTEMS INC	1- 11	1 3/8	- 1/8	-8.3	O	KEYDATA CORP	4- 12	5 5/8	- 3/8	-6.2	A	MILGO ELECTRONICS	14- 28	16 1/2	- 3/4	-4.3						
N	VARIAN ASSOCIATES	10- 20	11 7/8	+ 3/4	+6.7	O	LOGICON	2- 7	2 3/8	- 1/8	-5.0	N	MOMAW DATA SCI	2- 13	3 1/2	- 1/2	-12.5						
N	WANG LABS.	13- 34	17	-1 1/8	-6.2	O	MANAGEMENT DATA	1- 5	1 5/8	+ 1/4	+18.1	O	MDEC COMPUTER SYST.	2- 6	2 3/4	0	0.0						
N	XEROX CORP	107-169	119	+ 3/4	+0.6	O	NATIONAL CSS INC	18- 42	34 1/2	+3	+9.5	O	OPTICAL SCANNING	2- 8	3 1/2	+ 1/4	+7.6						
LEASING COMPANIES																							
A	BDOH COMPUTER	1- 5	1 1/8	0	0.0	O	NATIONAL COMPUTER CO	1- 1	3/8	0	0.0	O	PERTEC CORR	3- 8	4 3/4	- 1/4	-5.0						
O	BRESNAHAN COMP.	1- 2	2	0	0.0	O	NATIONAL INFO SRVCS	1- 2	1/8	- 1/8	-50.0	O	RHOTOH	3- 7	3 3/4	0	0.0						
O	COMDISCO INC	4- 17	5 3/8	0	0.0	P	ON LINE SYSTEMS INC	12- 27	29 3/8	+2 7/8	+10.8	A	ROTTER INSTRUMENT	2- 9	4 1/8	+ 3/4	+22.2						
O	COMMERCE GROUP CORP	3- 6	6 1/8	+ 5/8	+11.3	N	PLANNING RESEARCH	2- 7	3	+ 1/8	+4.3	O	RRECTION INST.	2- 6	2 3/8	+ 5/8	+35.7						
O	COMPUTER EXCHANGE	1- 1	1/4	0	0.0	O	PROGRAMMING METHODS	17- 25	17	0	0.0	O	QUANTOR CORP	4- 10	4 1/4	0	0.0						
A	COMPUTER INVESTS GRP	2- 8	2 3/8	+ 1/4	+11.7	O	RADIOGRAPH & SYS	1- 1	5/8	- 1/8	-16.6	N	RECOGNITION EQUIP	2- 8	4 3/8	+ 1/8	+2.9						
O	COMP. INSTALLATIONS	1- 2	1	0	0.0	O	RADIOGRAPH INC	3- 24	2 7/8	0	0.0	N	SANDERS ASSOCIATES	6- 18	8 1/8	0	0.0						
M	DATAPOINT RENTAL	1- 3	1 5/8	+ 1/8	+8.3	O	SCIENTIFIC COMPUTERS	1- 3	3/4	+ 1/8	+20.0	O	SCAN DATA	1- 6	1 7/8	- 1/8	-6.2						
A	OCL INC	0- 3	3/4	0	0.0	O	SIMPLICITY COMPUTER	1- 4	1 1/8	- 1/8	-10.0	O	STORAGE TECHNOLOGY	11- 34	12 3/4	-1 3/4	-12.0						
A	OEARRBORN-STORM	12- 26	18	+ 1/2	+2.8	O	TAS COMPUTER CENTERS	2- 9	8 1/2	0	0.0	O	SYCOR INC	9- 20	9	- 1/2	-5.2						
N	ORF INC	3- 9	3 7/8	+ 1/4	+6.8	O	TCC INC	1- 1	3/8	0	0.0	O	TALLY CORP.	2- 14	3 1/2	+ 3/4	+27.2						
O	EOP RESOURCES	1- 3	3 1/4	0	0.0	O	TYMSHARE INC	6- 13	7 3/4	+ 1/4	+3.3	O	TEC INC	5- 9	5 1/2	- 1/4	-4.3						
A	GRANITE MGT	2- 6	2 5/8	- 1/8	-4.5	O	UNITED DATA CENTER	3- 6	3 1/4	0	0.0	N	TEKTRONIX INC	30- 55	35 7/8	-1	-2.7						
A	GREYHOUND COMPUTER	3- 6	5 1/8	- 3/4	-12.7	A	URS SYSTEMS	2- 8	3	0	0.0	N	TELEX	3- 8	3 1/4	- 1/8	-3.7						
A	ITEL	4- 12	5 3/4	+ 1/4	+4.5	N	WYLY CORP	3- 11	3 7/8	- 1/4	-6.0	O	WANGCO INC	7- 13	11 1/8	+1 1/8	+11.2						
N	LEASCO CORR	8- 18	8 5/8	- 3/8	-4.1	PERIPHERALS & SUBSYSTEMS												O	WILTEK INC	6- 18	6 3/4	+ 1/2	+8.0
O	LEASPCORP	1- 2	1	0	0.0	N	ADDRESSOGRAPH-MULT	9- 34	10 1/8	0	0.0	O	BALTIMORE BUS FORMS	5- 9	4 3/4	0	0.0						
O	LECTRO MGT INC	1- 2	3/8	- 1/8	-25.0	O	ADVANCED MEMORY SYS	4- 23	5 1/2	-1	-15.3	A	BARRY WRIGHT	5- 13	5 3/4	+ 1/8	+2.2						
O	NRG INC	3- 15	4 3/4	- 1/4	-5.0	N	AMRX CORP	3- 7	4 1/2	+ 1/4	+5.8	O	CYBERMATICS INC	1- 3	1 3/8	- 1/8	-8.3						
A	PIONEER TEX CORP	4- 8	4 7/8	- 1	-2.5	O	ANDERSON JACOBSON	2- 6	2 1/4	0	0.0	A	DATA DOCUMENTS	17- 29	28 1/2	+2 5/8	+10.1						
A	ROCKWOOD COMPUTER	1- 3	1 1/4	+ 1/8	+11.1	O	REEHIVE MEDICAL ELEC	4- 10	5 3/4	- 1/2	-8.0	O	OURLEX PRODUCTS INC	6- 10	8	0	0.0						
N	U.S. LEASING	16- 36	20 1/2	+2 1/4	+12.3	A	ROLT-REARNEK & NFW	6- 12	8 1/4	- 3/4	-8.3	N	ENNIS BUS. FORMS	5- 8	5 7/8	+ 1/8	+2.1						
EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-PAUL; WASH																		O	GRAMAM MAGNETICS	7- 20	9	0	0.0
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER																		O	GRAMIC CONTROLS	7- 12	8	+ 1/2	+6.6
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID																		N	3M COMPANY	71- 91	76	-1 1/2	-1.9
(1) TO NEAREST DOLLAR																		O	MOORE CORR LTO	30- 65	50	-2	-3.8
																		N	NASHUA CORP	66- 58	44 1/8	+1	+2.3
																		O	REYNOLDS & REYNOLD	26- 51	27 3/4	-1 1/4	-4.3
																		O	STANARO REGISTER	11- 20	13 3/4	+ 1/4	+1.8
																		O	TAB PRODUCTS CO	7- 23	7	0	0.0
																		N	UARC	15- 23	19 1/2	+1 7/8	+10.6
																		A	WABASH MAGNETICS	5- 8	6 1/8	+ 1/4	+4.2
																		N	WALLACE BUS FORMS	15- 26	14 7/8	- 1/8	-0.0

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